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VICKERS-ARMSTRONGS
LIMITED



HANDBOOK
OF THE
VICKERS MACHINE GUN
(Water Cooled)
FOR
LAND SERVICE
(Class "C"—Rifle Calibre)

The accessories, spare parts and tools to be supplied are specified for each particular order or contract and do not necessarily include all those referred to in this handbook.

HANDBOOK
OF THE
VICKERS MACHINE GUN
(Water Cooled)
FOR
LAND SERVICE
(Class "C"—Rifle Calibre)



VICKERS-ARMSTRONGS LIMITED

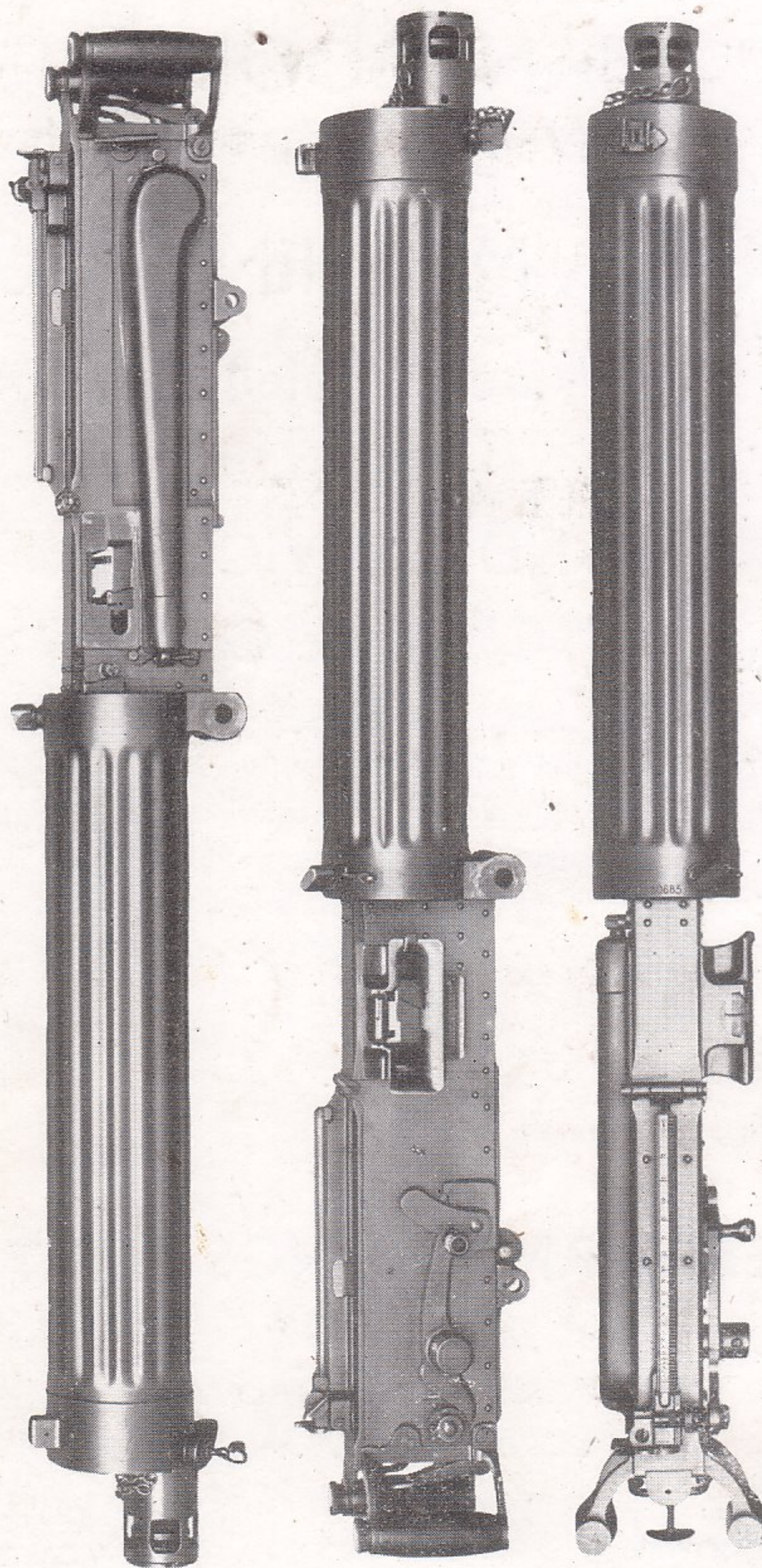
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Vickers Machine Gun (Water Cooled) for Land Service.
(Class "C"—Rifle Calibre).

HANDBOOK OF THE VICKERS MACHINE GUN (Water Cooled) FOR LAND SERVICE (Class "C"—Rifle Calibre)

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HANDBOOK

OF THE

VICKERS MACHINE GUN

(Water Cooled)

FOR

LAND SERVICE

(Class "C"—Rifle Calibre)

GENERAL DATA

Weight of Gun (without Water)	..	..	32 lb.	=	14.5 kg.
Weight of Gun (with Water)	..	..	42 lb.	=	19 kg.
Rate of Fire	..	..	..	..	550 to 600 r.p.m.
Length of Recoil of Barrel (approx.)	..	..	1 in.	=	25.4 mm.
Length of Barrel	..	..	28.4 in.	=	721.3 mm.
Length of Gun (overall)	..	..	43 in.	=	1.092 metres.

VICKERS MACHINE GUN

(Water Cooled)

FOR

LAND SERVICE

(Class "C"—Rifle Calibre).

GENERAL CHARACTERISTICS

The Gun is fully automatic in action, the force of recoil of the Barrel (when a cartridge is fired) being utilised to actuate the loading and firing mechanism.

Ammunition is fed to the Gun in canvas belts usually having a capacity of 250 rounds.

The Barrel of the Gun is water cooled, enabling the Gun to fire for long periods without becoming overheated.

The mechanism of the Gun is of robust construction, able to withstand prolonged firing for long periods.

The mechanism is readily accessible, and a feature of the Gun is that the Feed Mechanism and the Lock (or Breech Mechanism) are each self-contained units, either of which may be readily removed or replaced in a few seconds without any tools.

Adequate safety arrangements are incorporated in the Gun to ensure that the Cartridge is not fired until the Breech is positively closed.

The Gun may be fired at all angles of elevation or depression, without any adjustment of the mechanism being necessary.

Brief description of Gun. *(For detailed description see pages 3 to 15).*

The Barrel is supported at the breech and muzzle, in bearings in the front half of the Gun Casing, which forms a Water Jacket for the Barrel, and contains valve gear to regulate the escape of steam at any angle of fire.

The recoiling mechanism is contained in the rear of the Gun Casing and consists of the following :—

The Recoil Plates, which recoil with the Barrel.

The Crank, fitted in bearings between the rear of the Recoil Plates.

The Crank Handle, attached to the right-hand journal of the Crank, which projects through the Gun Casing. It has a cam-shaped surface to engage with a Roller on the right of the Gun Casing.

The Fuzee and Fuzee Spring, operated by the left-hand journal of the Crank. One end of the Fuzee Spring is attached to the Fuzee, the other to the Gun Casing.

The Lock, containing the Firing Pin and Spring, and Levers for their operation. It is attached to the Crank by a Connecting Rod. The Extractor has a sliding vertical movement on the front face of the Lock, and its movement is controlled by levers on the sides of the Lock, and by cams inside the Gun Casing.

The Feed Mechanism is contained in a block above the breech end of the Barrel, and is actuated by a lever engaging with the Left Hand Recoil Plate as it recoils. The Feed Mechanism is a system of pawls which engage with the Cartridges in the Belt to bring them to the correct position for extraction.

Brief description of Action *(For detailed description see pages 17 to 22).*

When the Gun is cocked and prepared for firing, the Extractor is engaging two live Cartridges, one in the Feed Block and the other in the chamber of the Barrel. On the Trigger being pressed, the Cartridge in the chamber is fired, and the Barrel recoils, together with the recoiling mechanism. After recoiling a short distance, the cam-shaped surface of the Crank Handle engages the Roller on the right of the Gun Casing, imparting a rotary movement to the Crank, which thus withdraws the Lock and Extractor, together with the live Cartridge from the Feed Block and the empty case from the chamber. When the live Cartridge has been completely withdrawn from the Feed Block, the Extractor is deflected downwards until the live Cartridge is in line with the Barrel. The empty case is now free to drop from the Extractor. During this movement, the Firing Pin is recocked by the levers in the Lock.

The Barrel is now returned to its normal position by the action of the Crank Handle on the Roller, assisted by the tension of the Fuzee Spring. On the return of the Barrel, a further live Cartridge is brought into position in the Feed Block.

When the Barrel is home, the rotary movement of the Crank is reversed by the tension which has been imparted to the Fuzee Spring, by the movement of the Crank. The Lock is thus returned to its home position, and the live Cartridge on the Extractor is inserted into the Barrel chamber.

During the final movement of the Lock, the Extractor rises to engage the live round in the Feed Block. When the Lock is fully home, a powerful toggle is formed between the Crank Axis and the Lock, which ensures that the breech is positively closed before the Cartridge can be fired.

The Cartridge is then automatically fired, and if the Trigger is still pressed, the cycle of operations described is repeated until the Trigger is released or the ammunition exhausted.

GENERAL DESCRIPTION.

NOTE.—*The reference numbers used in the Handbook correspond with those of the Nomenclature and Plates.*

The components of the Gun may be divided into four groups, viz. :—

1. Non-Recoiling Parts.
2. Recoiling Parts.
3. Feed Mechanism.
4. Sights.

NON-RECOILING PARTS

Breech Casing. (*See Plate 9, Page 49*).

Consists of two Side Plates, L.H. (88) and R.H. (80), connected together at the bottom by the Bottom Plate (92) and riveted at the front to the Trunnion Block (93). On the top of the Casing are two covers, Front (77) and Rear (67), having a common Axis Pin (73), and at the rear the Handle Block (55) is hinged at the bottom and retained in its normal position by the Handle Block Securing Pin (58). Gaps are formed in the front of the plates to receive the Feed Box (41). On the inside of each plate are riveted the Side Cams (82 and 90) to control the path of the Extractor (16). Steps are formed in the rear of the Cams to retain the Lock (or Breech Mechanism) in its withdrawn position if required, and also to prevent the Lock

from going forward if, due to a weak charge, it has not recoiled sufficiently to permit the Extractor (16) to drop to its low position for inserting the live Cartridge in the Barrel (40). Gaps are cut in the rear of each Side Plate to form bearings for the Recoil Plates (36 and 38). The left-hand gap is closed by the Filling-in Piece (89), and the right-hand gap by the Roller Bracket (81).

The Roller (83) rotates on a spindle on the Roller Bracket (81). On recoil, the curved surface of the Crank Handle (29) bears against the Roller (83), thus forcing the Crank Handle (29) with the Crank (26) to rotate and withdraw the Lock from the Barrel face.

The Dead Stop (85) is retained on the Dead-Stop Bracket (86) on the outside of the Right-Hand Side Plate (80). Its object is to prevent the Crank Handle (29) from rebounding.

Trunnion Block and Water Jacket. (*See Plate 9, Page 49.*)

The Trunnion Block (93) connects the Water Jacket (94) to the Breech Casing and is bored to form a bearing for the breech end of the Barrel (40). The Water Jacket (94) is screwed into the front, and the bottom is formed into two lugs, connected together by the hollow Distance Piece (93a) by which the Gun is attached to the mounting.

The Water Jacket (94) is corrugated and is closed at the front by the End Cap (95), screwed into position.

Screwed into the inside of the End Cap (95), the Stuffing Box (96) forms a bearing for the Muzzle End of the Barrel (40). Asbestos Packing (111) is packed in front of the Stuffing Box (96) to prevent water from leaking round the Barrel (40). It is retained in position by the Packing Gland (129), which is extended to receive the Muzzle Attachment Sleeve (130). The Foresight Bracket (153a), dovetailed to receive the Foresight (153), is riveted to the top of the End Cap (95). It is provided with guards on each side, to protect the Foresight (153) from damage during transport.

The Steam Tube (98) is closed at both ends by the Steam Tube Plugs, Front (102) and Rear (101). It is held inside the Water Jacket (94) near the top, the Rear Plug (101) resting in the Steam Tube Socket (100) riveted to the front of the Trunnion Block (93), the Front Plug (102) being screwed into the End Cap (95) and retained thereto by the Fixing Screw (103).

The Steam Tube (98) has ports near each end, to allow steam to enter and also communicates with the Steam Outlet Tube (104) in the End Cap (95) to allow the steam to escape from the Gun.

The Slide Valve (99) slides freely on the Steam Tube (98), and when the Gun is elevated it slides backwards to close the rear port, thus preventing water from entering the Steam Tube (98), while permitting any steam to enter through the port at the front. Similarly, when the Gun is depressed, the Slide Valve (99) slides forward to close the front port, and permits any steam to enter through the port at the rear.

The Hose Connection (109d) is fitted to the End Cap at the lower end of the Steam Outlet Tube (104). It is flanged for the attachment of the Steam Hose Pipe (185), which leads any steam away from the Gun. A Cork Plug (109) is provided to plug the steam escape hole during transport.

Bottom Plate (92). (*See Plate 9, Page 49.*)

This is provided with lugs by which the rear of the Gun is attached to the Elevating Gear on the Mounting. It is fitted with a Shutter (92a) which closes the front of the underside of the Breech Casing during transport to prevent dust from entering.

It is retained in either its open or closed position by the Spring-Loaded Catch (92b), engaging in recesses cut in the Bottom Plate (92).

Handle Block (55). (*See Plates 4 and 9, Pages 44 and 49.*)

This is provided with two Handle Grips (56) which are hollow and contain Oil Reservoirs (55c). The Oil Brushes (55b) are screwed into the tops of the Reservoirs. The Oil Brush Retaining Springs (55d) riveted to the top of the Handle Block (55) engage serrations formed on the underside of the Oil Brush Head (55a) and prevent the Oil Brush (55b) from becoming accidentally unscrewed. The Trigger (59) has its axis at the bottom of the Handle Block and has pivoted to its centre the Trigger Pawl (61) which, projecting through the Handle Block (55), engages the Trigger Lever (63), pivoted at its centre to the front of the Handle Block. The top of the Trigger Lever (63) is in engagement with the rear of the Trigger Bar (74) on the underside of the Rear Cover (67). The Safety Catch (64) is pivoted to the rear of the Handle Block (55) and engages with the top of the Trigger (59) to prevent accidental firing. The Safety Catch and Trigger-Lever Spring (66) retains the Trigger Lever (63) and the Safety Catch (64) in their normal position.

The Handle Block (55) is retained in position by the Hinge Pin (57) and Securing Pin (58).

The Securing Pin (58) is fitted with a spring loaded snib (58a), which engages recesses formed in the Handle Block (55) and prevents the Securing Pin (58) from becoming accidentally unscrewed.

Rear Cover (67). (*See Plate 9, Page 49.*)

This closes the recoiling mechanism in the Breech Casing. It is hinged to the Side Plates (80 and 88) at the front, and is retained in its closed position by the Spring-Loaded Catch (68) engaging with a recess at the top of the Handle Block (55). On its underside, it is grooved to receive the Trigger Bar (74), and also forms a bearing surface for the top of the Lock Frame (1) during recoil. The Extractor Guides (72) are riveted on the underside to control the path of the Extractor (16) in conjunction with the Side Cams (82 and 90) on the Side Plates. The Trigger Bar (74) transmits the movement of the Trigger (59) and Trigger Lever (63) to the Handsear (7) in the Lock, and is retained in its normal position by the Trigger-Bar Spring (75) fitting in a recess in the rear of the cover.

The Rear Sight is attached to the top of the Cover.

Front Cover (77). (*See Plate 9, Page 49.*)

This retains the Feed Box (41) in position, and is held in its closed position to the front of the Breech Casing by the Front-Cover Catch (78) engaging with the Locking Pin (79), which rotates in the Breech Casing and is retained in the closed position by the Spring-Loaded Snib (78a) engaging with a recess in the Breech Casing.

Fuzee Spring and Box. (*See Plates 5 and 9, Pages 45 and 49.*)

The Fuzee Spring (34) is a helical extension spring which is extended when the Barrel and Mechanism recoils and thus stores up energy to return the Barrel and Mechanism to their forward position. The front is screwed to the vice-handled Fuzee-Spring Tension Screw (35), which is held in the front of the Fuzee-Spring Box (91), and on being turned, varies the initial tension on the Spring. The rear end of the Spring is provided with a Hook (34a) by which it is attached to the Fuzee (32) on the Crank (26).

The Fuzee-Spring Box (91) has two hooks at the front which engage with Studs on the Breech Casing, and is retained in position on the Studs by the tension of the Fuzee Spring (34). The rear has a forked bracket which is retained on a Stud on the Left-Hand Filling-in Piece (89).

Muzzle Attachment. (*See Plate 9, Page 49*).

The Muzzle Attachment Sleeve (130) has a series of internal segmental lugs at the rear, by which it is attached, bayonet joint fashion, to the Packing Gland (129) and retained in position by the Securing Pin (131). The cup-shaped Front Disc (132) is screwed into the front of the sleeve, and the Barrel Disc (134) on to the end of the Barrel (40). When a cartridge is fired, the propelling gases escaping from the muzzle of the Barrel (40) impinge on to the Front Disc (132) and the back pressure created, re-acts on the Barrel Disc (134), thus increasing the force of recoil of the Barrel (40). The rear of the Front Disc (132) is encased in a sheet metal Cap (133). The Caps (133) should be replaced when they become badly fouled or eroded.

RECOILING PARTS.

Barrel. (*See Plates 5 and 9, Pages 45 and 49*).

The Barrel (40) is chambered and rifled to suit Service Ammunition. The Breech End is formed into a square block, on which are two spigots to engage with the Recoil Plates (36 and 38). The Breech Face is cut away to enable the Extractor (16) to engage with a cartridge in the chamber. A Cannelure (40a) is cut round the rear, for asbestos packing, and the front is screwed to receive the Barrel Disc (134).

Recoil Plates (Right and Left). (*See Plates 9 & 10, Pages 43, 45 & 50*).

These connect the Barrel (40) to the Crank (26). They are bored at the front to receive the trunnions on each side of the Barrel (40) and at the rear, for the journals of the Crank (26).

Along the inside lower edge are Guides (38a) in which the flanged bottom of the Lock Frame (1) slides. Gaps are formed in the Guides (38a) to enable the Lock to be removed when withdrawn.

The Recoil Plate, L.H. (38) has an extension at the front, in which is a gap to engage with the Feed Box Lever, Lower (50).

At the rear of both Recoil Plates (36 and 38) are square projections, which form sliding bearings in the gaps at the rear of the Breech Casing.

The Extractor Holding-Up Springs (37 and 39) are riveted on the inside at the front, to retain the Extractor (16) to ensure that it does not drop as the Gun is being cocked.

Crank. (*See Plates 3, 9 and 10, Pages 43, 49 and 50*).

The Crank (26) has journals on each side which rotate in the Recoil Plates (36 and 38). The right-hand journal is extended and formed into a hexagon, on which the Crank Handle (29) is driven, and secured by the Crank Handle Securing Screw (31).

The left-hand journal is bored, counterbored and slotted to receive the Fuzee (32). The front of the Crank is bored transversely to receive the Crank Pin (27), on which one end of the Connecting Rod (23) rotates.

Connecting Rod. (*See Plates 3, 9 and 10, Pages 43, 49 and 50*).

The Connecting Rod (23) connects the Crank (26) to the Lock, its free end being formed to engage, bayonet joint fashion, with the Side Lever (13) of the Lock.

The Adjusting Nut (24) is screwed on the Connecting Rod (23), and by placing Adjusting Washers (25) between the Nut and the Shoulder of the Connecting Rod (23), the Cartridge Head Space may be adjusted when required.

Crank Handle. (*See Plates 3 and 9, Pages 43 and 49*).

The Crank Handle (29) fitted to the right of the Crank (26) is a lever of special curved form. A Knob (30) is fitted to the front to enable the handle to be operated by hand.

Fuzee. (*See Plates 5 and 9, Pages 45 and 49*).

The Fuzee (32) connects the Fuzee Spring (34) to the Crank (26). It is rotated with the Crank and extends the Fuzee Spring (34) during recoil. It has a spindle with lugs, which engage inside the left-hand journal of the Crank (26). It is provided with two Links (33), the front link having a transverse pin which is attached to the Fuzee Spring Hook (34a).

Lock or Breech Mechanism. (*See Plates 2, 9 & 10, Pages 42, 49 & 50*).

The Lock Frame (1) is flanged at the bottom to engage with the Recoil Plates (36 and 38) and has vertical guides at the front on which the Extractor (16) slides. Internally, it contains the Firing Pin (5), the Safety Sear (2), the Handsear (7), the Tumbler (6), and the Main Spring (9).

The Firing Pin (5) has a firing point at the front, and is recessed at the top to engage with the Tumbler (6) and has also a projection towards the front, against which the longer arm of the Main Spring (9) abuts. On its underside it has a bent which is engaged by the Safety Sear (2) until the

Lock is in its firing position. It has a sliding horizontal movement in the lower part of the Lock Frame (1).

The Tumbler (6) is an L-shaped lever, pivoted on the Axis Pin (11). Its shorter arm engages with the Firing Pin (5) and its longer arm with the centre of the Side Lever (13) during cocking action. The Tumbler (6) has a bent by which it is retained in its cocked position by the Handsear (7) which is pivoted on the Handsear Axis Pin (8) and is engaged at the top by the Trigger Bar (74) in the Rear Cover (67). The Safety Sear (2) is a lever pivoted at the front on the Axis Pin (4) underneath the Firing Pin (5). It has a bent on its top surface to engage with a corresponding bent on the underside of the Firing Pin (5) and is held against the Firing Pin by the Safety Sear Spring (3) which bears against the bottom of the Lock Frame (1). The rear of the Safety Sear (2) projects outside the rear of the Lock Frame (1), and is engaged by the underside of the Side Lever (13) when the Lock is in its firing position. The Main Spring (9) has two unequal arms. The longer arm is towards the front, and engages with the Firing Pin (5). The shorter arm abuts against the front of the Handsear (7) and holds it against the Tumbler (6). The Main Spring (9) is held under the upper part of the Lock Frame (1).

Fitted externally to the Lock Frame are the Lifting Levers, Right (10) and Left (10a), the Side Levers (13) and the Extractor (16).

The Lifting Levers (10 and 10a) are pivoted to the Lifting Lever and Tumbler Axis Pin (11), and at the front they engage with the Extractor (16) under the Horns (17).

The Side Lever (13) is forked and embraces the Lifting Levers (10 and 10a). It is pivoted on the Side Lever Axis Pin (14), and at its rear connects with the Connecting Rod (23). The top of the fork is formed into cams which engage with projections on the Lifting Levers (10 and 10a) to actuate them to raise the Extractor (16). The Side Lever Axis Pin (14) is retained in the Lock Frame (1) by the Spring Pin (15).

The downward movement of the Lifting Levers (10 and 10a) is limited by Stops (12) integral with the outside of the Lock Frame (1).

The Extractor has a vertical sliding motion on the front of the Lock Frame (1). Its face is flanged to engage the base of the Cartridge, which is retained in position until it is inserted in the Barrel (40) by the Gib (20) under the action of the Gib Spring (21). Horns (17) are formed on each side at the top which, engaging with the Side Cams (82 and 90) and the

SIGHTS.

Sight for Surface Fire. (*See Plate 6, Page 46*).

The sight for surface fire is of "Tangent" pattern. The rear sight consists of the Rear Sight Stem (141) and the Carriage (146). The Stem (141) is hinged to the Rear Cover (67) and is retained in either its erect or folded position by the Plunger (143) and Spring (144) housed in the top of the Rear Cover (67) and engaging with the base of the Stem (141).

The right-hand side of the Stem (141) is formed with a rack to engage the Sight Carriage Pinion (147). The Graduation Strip (145) is fixed along the left of the Rack by the Screws (152 and 152a). The Top Screw (152) is formed with a round head which acts as a stop to prevent the Sight Carriage (146) from being accidentally removed.

The Graduation Strip (145) is engraved with lines and figures to indicate the height at which the Sight Carriage should be set, to suit the desired range.

The Rear Sight Carriage (146) is retained on the Stem (141) by the Clamping Strip (148).

The Clamping Screw (149) enables the Carriage (146) and Strip (148) to be clamped together at the desired position on the Stem (141). A Pinion (147) is fitted on the Axis of the Clamping Screw (149), and by moving the Pinion with the ball of the thumb, fine adjustments of the Sight Carriage are obtainable. A Friction Spring (151) is fitted between the Strip (148) and the Stem (141).

The left of the Carriage (146) is formed with a sighting "U" for surface fire, and also with a large aperture for use with the Anti-Aircraft Fore Sight, when this is supplied.

The Fore Sight (153) for surface fire is of conventional pattern, with a dovetail on its underside, which is fitted into the corresponding dovetail on the Fore Sight Bracket (153a) on the End Cap (95).

ANTI-AIRCRAFT SIGHT.

(Supplied as an Accessory)

The Anti-Aircraft Rear Sight is an aperture of arbitrary size incorporated in the Rear Sight Carriage (146) on the Sight Stem (141).

The Anti-Aircraft Fore Sight (181) (*See Plate 8, Page 48*) is of the "forward area" pattern. It consists of an outer oval for high altitudes,

and an inner oval for lower altitudes, which when viewed through the rear sight aperture represent two imaginary circles in the sky at definite assumed heights and at definite assumed angles from the horizontal.

Each imaginary circle is so proportioned that the time of flight of a bullet to reach the centre would be equal to the time taken for an aeroplane to fly from the edge of the circle to the centre when flying at a definite assumed speed.

To use the sight the gunner has first to decide which oval to use, i.e., whether the target is a high or a low one. If high, he directs his sight so that the nose of the aircraft is on the periphery of the larger oval, and the direction of movement towards the centre. This gives the correct displacement of the line of sight in both horizontal and vertical planes for the assumed conditions. Variations from the assumed conditions for which the ovals are calculated can only be dealt with by the skill and judgment of the gunner, but the normal dispersion arising from machine-gun fire gives a wide cone of effect, which renders absolute accuracy of aim unnecessary.

For targets flying at low altitudes the smaller oval is used in a precisely similar manner.

The Sight Carriage (146) should be adjusted to the red line on the Sight Stem (141).

The following figures and notes show the correct and incorrect method of aiming with the "Forward-Area" Anti-Aircraft Sight. In these diagrams the outer circle represents the aperture in the rear sight, through which the oval rings, comprising the fore sight, and the target are seen:—

FIG. 1. Outer Ring in use (altitude 90 m. to 900 m.).

Correct. The Aircraft is flying towards the Ring Centre, the nose of the Aircraft is touching the Outer Edge of the Ring selected, and the point where the nose of the Aircraft touches the Outer Edge is centred in the Rear-Sight Aperture.

FIG. 2. Outer Ring in use (altitude 90 m. to 900 m.).

Incorrect. The Aircraft, while touching the Outer Edge of the Ring selected, is *not* flying towards the Ring Centre. The Bullets would pass *below* the Target.

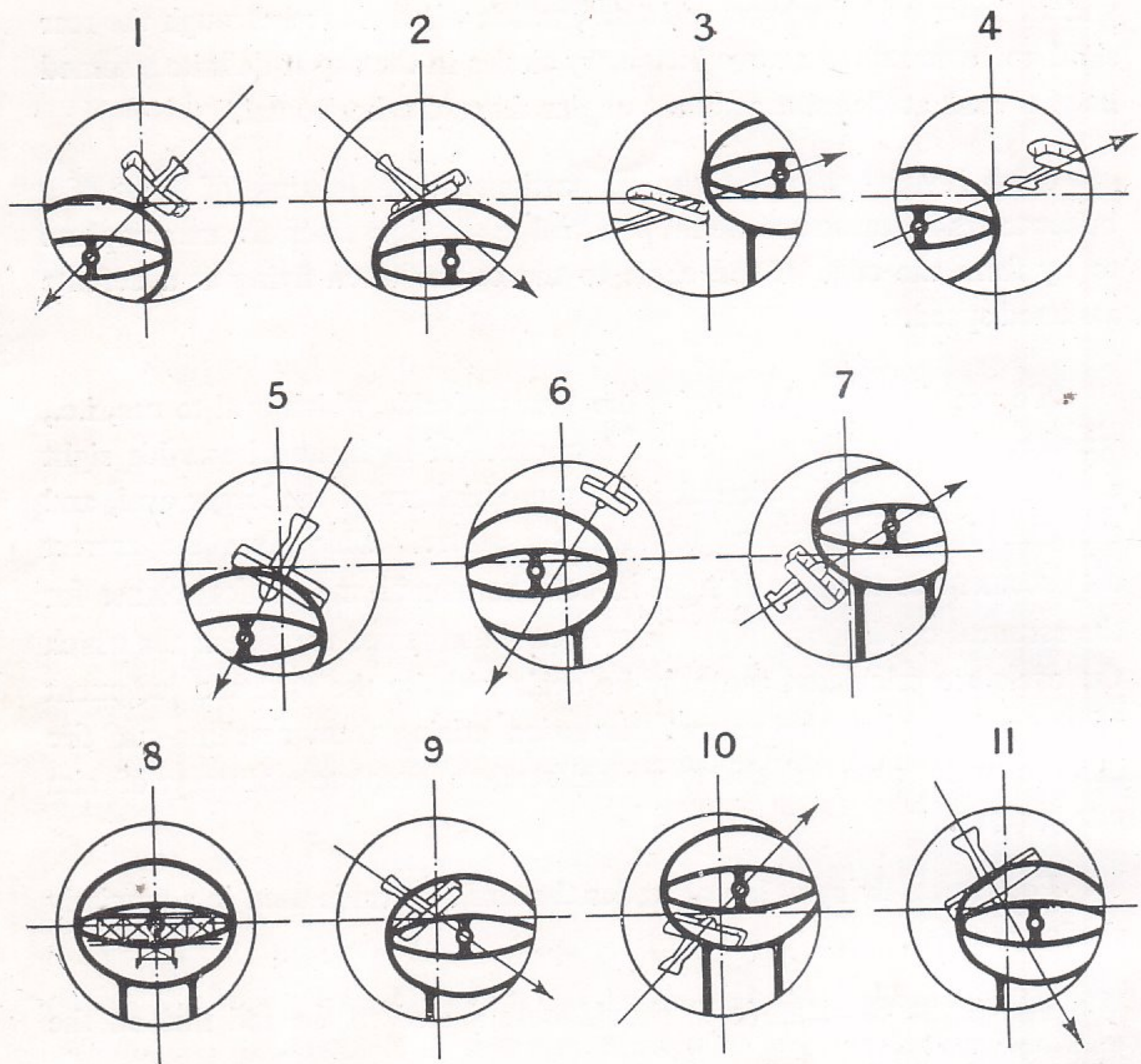


FIG. 3. Outer Ring in use (altitude 90 m. to 900 m.).

Incorrect. The nose of the Aircraft is *not* touching the Outer Edge of the Ring, although it is flying towards the Ring Centre. If fire were opened on this sighting the Bullets would pass in *front* of the Target.

FIG. 4. Outer Ring in use (altitude 90 m. to 900 m.).

Incorrect. The Aircraft is flying away from, instead of towards, the Ring Centre. The Bullets would pass a long way *behind* the Target.

FIG. 5. Outer Ring in use (altitude 90 m. to 900 m.).

Incorrect. The nose of the Aircraft is *not* touching the Outer Edge of the Ring selected, but has passed inside that Ring, too close to the Ring Centre. On this sighting fire would be opened too late and the Bullets would pass *behind* any vital part of the Aircraft.

FIG. 6. Either Outer or Inner Ring in use.

Incorrect. The Aircraft is not flying towards the Ring Centre, the nose is not touching the Outer Edge of the Ring selected, and the point where the nose of the Aircraft would touch either Ring is *not* centred in the Rear Sight. The Bullets would pass in *front* and to the *left* of the Aircraft.

FIG. 7. Outer Ring in use (altitude 90 m. to 900 m.).

Incorrect. The point where the nose of the Aircraft touches the Outer Edge of the Ring selected is not centred in the Rear-Sight Aperture. Even though the Aircraft is flying towards the Ring Centre and touching the Ring Edge properly, the point of nose contact is off the centre and the Bullets would consequently pass in *front* of the Aircraft.

FIG. 8. Centre Aperture in use.

Correct. The Aircraft is diving towards the Gun. Aim is taken by aligning the Ring Centre Aperture, centred in the Rear-Sight Aperture, upon the middle of the upper part of the plane. The Bullets would then *hit* the vital parts of the Aircraft.

FIG. 9. Inner Ring in use (altitude up to 90 m.).

Correct. The Aircraft is flying towards the Centre of the Ring, the nose of the Aircraft is touching the Outer Edge of the Ring selected, and the point of contact between the nose of the Aircraft and the Outer Edge of the Ring selected is centred in the Rear-Sight Aperture.

FIG. 10. Inner Ring in use (altitude up to 90 m.).

Incorrect. The nose of the Aircraft is not touching the Outer Edge of the Ring selected. The Bullets would pass in *front* of the Target.

FIG. 11. Inner Ring in use (altitude up to 90 m.).

Incorrect. The Aircraft is not flying towards the Ring Centre. The Bullets would pass to the *right* of the Aircraft.

The Anti-Aircraft Fore Sight (181) is hinged to a Clamping Bracket (175) which is clamped around the rear of the End Cap (95) of the Water Jacket (94) by the Clamp Screw (176) and Handle (179) and is located on the Fore-Sight Bracket (153a). The Axis Pins (182) are fitted with Springs (183) which force projections around the Fore-Sight Hinge Axis to engage

with corresponding recesses on the Clamping Bracket (175) to retain the Fore Sight (181) in either its folded or opened position. When not required for immediate use, the Fore Sight (181) is folded down to lie on the top of the Water Jacket (94).

Accessories.

The Ammunition Belt and the Belt-Filling Machine are supplied as accessories.

Ammunition Belt. (*See Plate 7, Page 47*).

The Belts (173) consist of two strips of canvas bound together with brass strips which form pockets, into which the cartridges are pushed. Brass tags are riveted to each end to facilitate the insertion of the end of the belt into the feed block.

Normally the belts have a capacity of 250 rounds.

Steam Hose Pipe (with Clips).

The Steam Hose Pipe (185) is a metallic tube, one end of which is fitted with a tapered spigot, which fits into the Hose Connection (109d) on the Gun, and is retained thereto by two Spring Loaded Clips hinged to the upper part of the spigot.

Belt-Filling Machine. (*See Plate 13, Page 53*).

The Belt Filling Machine (186) enables the ammunition belts to be quickly and correctly loaded with ammunition. For transport, it is able to be readily dismantled and packed into a box of convenient size.

The Belt Filling Machine consists of the following:—

- (a) The Body on which is assembled the mechanism for opening the pockets in the Ammunition Belt, and inserting the cartridges therein.
- (b) The Clamp Bracket, with clamping screw for clamping to a bench or other convenient support. It is dovetailed on the top to receive the base of the Body, which is retained in position by a Locking Pin.

- (c) A Hopper, into which the loose ammunition is placed, and guided to the mechanism in the Body.

The base of the Hopper is formed with an elongated projection, which fits into a corresponding hole in the Body.

- (d) The Operating Handle, which is fitted to a hexagonal spindle on the body, and is retained thereto by a securing pin.
- (e) The Charger Guide, which is fitted in a dovetailed recess at the top of the Hopper. Its object is to enable cartridges in chargers to be readily stripped therefrom directly into the Hopper.

To Assemble the Belt Filling Machine.

To assemble the Belt Filling Machine, clamp the Clamp Bracket to a convenient support, then slide the Body on to the Bracket, and secure by turning the Locking Pin from right to left. Fix the Operating Handle in position, and secure by the securing pin.

Turn the Operating Handle until the plunger on the Body is drawn as far as possible to the right, and insert the projection on the base of the Hopper into its seat in the Body, and press the Hopper down until it is correctly seated. Slide the Charger Guide into the top of the Body.

To Load a Belt with the Belt Filling Machine.

Uncover the belt passage on the Body, by swinging to the left the thin steel cover, which is hinged to the Body. Then pass the end of the belt under the pawl which rests on the belt passage, and insert a cartridge by hand in the first pocket of the belt. The thick edge of the belt should point towards the left. Then close the belt cover and pull the belt backwards until the cartridge in the end pocket is resting against the pawl.

Fill the hopper with cartridges, and turn the Operating Handle slowly until the Belt is fully loaded.

If the cartridges are supplied in chargers, the chargers should be placed in the Charger Guide, and the cartridges pressed downwards when they will fall into the Hopper.

The Operating Handle should be lightly held, and if a jam occurs, it should be immediately investigated and rectified, otherwise the Belt may be damaged.

Should the column of cartridges in the Hopper become wedged, a light tapping of the Hopper will usually remedy the interruption of feed.

To Dismantle the Belt Filling Machine.

Turn the Operating Handle until the Cartridge Plunger is drawn as far as possible to the right, and remove the Hopper by lifting it upwards. Remove the Charger Guide. Knock out the Operating Handle Securing Pin and remove the Operating Handle. Turn the Body Locking Pin from left to right, and slide the Body from the Clamp Bracket. Release the Clamp Screw and remove the Clamp Bracket from its support.

Care of Belt Filling Machine.

To ensure the efficient working of the machine, it should be kept clean, and the bearings properly oiled.

ACTION OF MECHANISM

To Prepare For Firing.

- (1) Pass the tag end of the Belt through the Feed Block (41) from the right-hand side.
- (2) Turn the Crank Handle (29) to the rear ; this withdraws the Lock from the Barrel and winds the Fuzee Links (33) to extend the Fuzee Spring (34).
- (3) Pull the Belt to the left as far as it will go. This brings a Cartridge into the centre of the Feed Block (41) where it is retained by the Pawls.
- (4) Release the Crank Handle (29) when the Lock will be propelled forward by the unwinding of the Fuzee Links (33) by the Fuzee Spring ; and the Extractor (16) will engage the Cartridge in the Feed Block.

- (5) Turn the Crank Handle (29) to the rear a second time. The Cartridge will be withdrawn from the Feed Block (41) by the Extractor (16) and placed in line with the Barrel.
- (6) Pull the Belt to the left again, when a second Cartridge will be brought to the centre of the Feed Block (41).
- (7) Release the Crank Handle (29) when the Lock will go forward to insert the first Cartridge in the Barrel and the Extractor (16) will also engage the second Cartridge in the Feed Block (41).

The Gun is now ready for firing.

To Fire the First Shot.

Raise the Trigger Safety Catch (64) and press the Trigger (59). This movement is transmitted to the Handsear (7) in the Lock, through the medium of the Trigger Pawl (61), the Trigger Lever (63) and the Trigger Bar (74). On the Handsear (7) being actuated, its lower portion is brought out of engagement with the bent on the Tumbler (6), which is thus free to pivot on its Axis Pin (11) and permits the Firing Pin (5) to be propelled forward under the influence of the Main Spring (9), to fire the Cartridge.

Action on Recoil.

When the Gun has just fired the first Cartridge, the Extractor (16) will be gripping the second Cartridge in the Feed Block (41) and the empty case of the first Cartridge in the Barrel Chamber.

The explosion will cause the Barrel and recoiling parts of the Gun to move backwards approximately 25 mm., at the same time extending the Fuzee Spring (34). During this action the tail of the Crank Handle (29) engages with the Roller (83) to force the Crank Handle (29) together with the Crank (26) to rotate and withdraw the Lock from the Barrel. The Fuzee (32) on the left of the Crank is also rotated, winding the Fuzee Links (33), thus putting additional tension on the Fuzee Spring (34).

As the Lock moves backward, the Extractor (16) withdraws the live Cartridge from the Feed Block (41) and the empty case from the Barrel. The path of the Extractor (16) is guided by the Side Cams (82 and 90) and the Rear Cover Extractor Guides (72), which engaging with the Horns (17)

of the Extractor (16) deflect it downwards as soon as the live Cartridge has been completely withdrawn from the Feed Block (41). The live Cartridge is thus placed in line with the Barrel and the empty case is free to drop from the Extractor (16).

The rotation of the Crank (26) imparts an upward movement to the Side Lever (13), the upper surface of which engages with the tail of the Tumbler (6), forcing it to pivot round its Axis (11).

The head of the Tumbler (6) being in engagement with a recess in the rear of the Firing Pin (5), the Firing Pin (5) is forced to the rear, where the bent on its underside is engaged by the bent on the top of the Safety Sear (2) forced upwards by the Safety-Sear Spring (3). The Firing Pin (5) is thus retained in its rearmost position.

The longer arm of the Main Spring (9) is in contact with a projection on the front of the Firing Pin (5), and is thus compressed as the Firing Pin (5) is withdrawn.

The shorter arm of the Main Spring (9) is bearing against the Hand Sear (7) and thus forces its lower portion to engage behind the bent of the Tumbler (6) as this rotates.

As the Side Lever (13) moves upwards, its front part becomes disengaged from the Lifting Levers (10 and 10a), which are then free to move downwards with the Extractor (16).

The Lower Feed Block Lever (50) is in engagement with the extension on the left-hand Recoil Plate (38), and is thus actuated as the Recoil Plate (38) moves backwards with the Barrel. This movement is transmitted through the Upper Feed Block Lever (49) to the Feed Block Slide (42), which is driven to the right, carrying with it the Actuating Pawls (43 and 43a), which slip over and engage behind the next Cartridge in the Belt. During this movement, the Belt is retained in the Feed Block by the Retaining Pawls (46) engaging with a further Cartridge.

Return Movement of the Recoiling Parts.

The Barrel and Recoil Plates (36 and 38) have recoiled about 25 mm., and their rearward motion is retarded by the tension of the Fuzee Spring (34) and they are finally brought to rest by the action of the Crank Handle (29) against the Roller (83). The Crank Handle (29), however, continues to rotate under the influence of the momentum acquired by the Crank (26),

that of the Firing Pin (5), which is thus propelled forward by the longer leaf of the Main Spring (9) to fire the Cartridge in the Barrel.

Automatic Action.

Assuming that the Gun has been correctly prepared for firing, and the Trigger (59) pressed, the cycle of operations described will be continued until the Trigger (59) is released, or the ammunition is exhausted.

Action on Releasing Trigger (Cease Fire).

When the Trigger is released, the Trigger Bar (74) returns to its forward position under the influence of the Trigger-Bar Spring (75) in the Rear Cover, and is thus held out of engagement with the Hand Sear (7). When the Lock returns to its foremost position, the Safety Sear (2) is depressed and brought out of engagement with the Firing Pin (5), which, however, is prevented from going forward by the Tumbler (6), the bent of which is now engaged by the Hand Sear (7) under the influence of the shorter arm of the Main Spring (9).

Assuming that there is still some ammunition in the Belt, the Gun remains cocked ready for further firing, the Extractor (16) engaging with two live Cartridges, one in the Barrel and one in the Feed Block (41).

Firing of Single Shots.

Single Shots can be fired by smartly pressing the Trigger (59) and instantly releasing each time.

The Gun can, however, be loaded to fire Single Shots as follows :—

To Load for Single Shots.

- (1) Pull the Crank Handle (29) to the rear.
- (2) Pull the Belt through the Feed Block (41) as far as it will go.
- (3) Release the Crank Handle (29) and the Extractor (16) will now be gripping one Round still in the Feed Block.
- (4) Again withdraw the Lock, *but do not touch the Belt.*

- (5) Let the Lock go forward. The Round is now in the Barrel Chamber and the Gun is ready for firing.

To Fire Single Shots.

- (1) Raise the Safety Catch (64) and press the Trigger (59), when the Gun will fire the first round.
- (2) If the Front Cover (77) be now opened and the Lock examined after firing the first round, it will be found that the Extractor (16) is gripping a Round in the Feed Block (41) (the same as "half load," i.e., one round on the Extractor at the top of the Lock), the Gun having functioned normally. To continue firing, it is only necessary to pull the Crank Handle (29) to the rear, without touching the Belt, fire and repeat this operation.

GENERAL INSTRUCTIONS

If, after prolonged firing, a part of the Lock, such as the Firing Pin (5), becomes worn or damaged, the Lock should be removed and replaced by a Spare Lock, an operation which takes only a few seconds. If, however, the Lock is subsequently made fit for use by replacing the worn-out Part by a new Part taken from the Set of Spare Parts, it should be put back into use and the Spare Part, if still in good condition, should be returned to the Spare Part Box.

To Remove the Lock.

To remove the Lock, open the Rear Cover (67), turn the Crank Handle (29) as far to the rear as possible and see that the Extractor (16) drops.

Take hold of the top of the Lock Frame (1) and raise the Lock, allowing the Crank Handle (29) to return slowly. Then, if there are any Live Cartridges in the Extractor (16) remove them while the latter is down. Take hold of the Lock in front, give it one-sixth of a turn to either side and lift it out.

When the Lock is out of the Gun and it is necessary to release the tension of the Main Spring (9), the Side Lever (13) should be in its lowest position and the top of the Hand Sear (7) should be pulled backwards ; great care should be taken before doing so to see that the Extractor (16) is at its highest point ; the Firing-Pin Hole in the Extractor (16) will then be in line with the Firing Pin (5). When releasing the tension on the Main Spring (9) care should be taken that the fingers of the hand are not held under the Tumbler (6).

To Replace the Lock.

To replace the Lock, cock the Lock by lifting the rear of the Side Lever (13) ; see that the Connecting Rod (23) is upright, then, after giving the Lock one-sixth of a turn to either side, slip the rear end of the Side Lever (13) over the end of the Connecting Rod (23) as far as it will go, turn the Lock to the front and lower it into the Breech Casing while turning the Crank Handle (29) over to the rear ; then see that the Lock Flanges are engaging in their Guides on the Recoil Plates (36 and 38) and let go the Crank Handle (29).

To Remove the Feed Block.

To remove the Feed Block (41), turn the Catch Locking Pin (79) and open the Front Cover (77). The Feed Block (41) can then be removed by lifting vertically upwards.

To Replace the Feed Block.

Open the Front Cover (77) and place the Feed Block (41) down into position, taking care that the Feed Block Slide (42) is well over to the left, so that the Stud on the Lower Lever (50) engages in the Recess in the left-hand Recoil Plate (38).

To Remove the Fuzee Spring Box.

To remove the Fuzee-Spring Box (91) press the Box forward, until the Lugs on it are clear of the Studs on the Breech Casing then disconnect the Fuzee (32) from the Crank (26) when the Fuzee (32), Link (33), Hook (34a), Fuzee Spring (34), Tension Screw (35) and Fuzee-Spring Box, which are all connected, can be removed as one unit.

To Replace the Fuzee Spring Box.

To replace the Fuzee-Spring Box, reverse the foregoing operations.

To Keep the Gun in Working Order.

Before taking the Gun into action, the surfaces on which all moving parts work should be thoroughly oiled, especially the following :—

- (a) Bearing Parts of the Barrel (40) and all Recoiling Parts.
- (b) The Lock Guides on the Recoil Plates (36 and 38) as well as the working Parts of the Lock itself. These include the internal components which can easily be lubricated through the opening on the upper surface of the Lock Frame (1), in addition to the external Parts such as the Levers (10, 10a and 13) and the Extractor (16).
- (c) The faces of the Feed Block (41) and the edges of the Cartridge Guides inside the Feed Block.
- (d) The bearings of the Crank (26) as far as they can be reached without stripping the Gun.

To Test the Friction of the Recoiling Parts.

In order to see that the Recoiling Parts work freely, remove the Fuzee Spring Box (91), take out the Lock, turn the Crank Handle (29) upwards, take hold of it with the right hand and the Fuzee (32) with the left, then slide the Recoiling Parts backwards and forwards to see that they move easily and that the Barrel (40) goes right home.

To Test the Pull of the Fuzee Spring (as measured on the Crank Handle).

Pull the Fuzee Spring (34) with a Spring Balance, proceeding as follows :—

First open the Rear Cover (67) and remove the Lock. Then place the loop of the Spring Balance upon the Knob (30) of the Crank Handle (29) and pull vertically upwards. The reading indicated when the Crank Handle (29) commences to move, will be the Pull of the Fuzee Spring (34) as measured on the Crank Handle (29). Normally, the pull should be about $3\frac{3}{4}$ kilogrammes.

To Renew the Packing at the Breech End of the Barrel.

Should the Gun leak at the Breech, remove the Lock, Feed Block (41) and Fuzee-Spring Box (91), then take out the "T" Pin (58) from the Handle Block (55) and turn the Handle Block (55) downwards.

Pull out the Roller Bracket (81) and the left-hand Filling-in Piece (89) and draw out the Recoiling Parts to the rear. Now lubricate a fresh piece of fine string asbestos packing with oil and wind it on the Cannelure (40a) of the Barrel, pressing it together with a thin piece of wood, or the point of a turnscrew, or knife, until the Cannelure is full. Then replace the Recoiling Parts, the Filling-in Pieces (81 and 89), the Fuzee-Spring Box (91), the Handle Block (55), the Feed Block (41) and the Lock.

To Renew the Packing at the Muzzle End of the Barrel.

Should the Gun leak at the Muzzle, remove the Muzzle Attachment Sleeve (130), unscrew the Muzzle-Attachment Packing Gland (129) and draw it forward. Then repack the Gland. It is not necessary to remove the Barrel Disc (134).

Points to be Attended to Before Firing.

- (a) Examine the Barrel (40) and see that the Bore is clear. This can easily be done by removing the Lock and looking through the Bore after the Handle Block (55) has been turned downwards for the purpose.
- (b) See that the Spare Lock is close at hand in case of need.
- (c) Examine the Ammunition and see that it is of the proper description, that the Ammunition Belts are correctly filled and carefully packed in the Ammunition-Belt Boxes—the Bullets pointing towards the Muzzle.
- (d) See that the Bottom-Plate Shutter (92a) is open.

Points to be Attended to During Firing.

- (a) That the hand is kept clear of the Crank Handle to avoid risk of injury.
- (b) That the Belt must ON NO ACCOUNT be pulled when the Gun is firing.
- (c) That the Belts are refilled without delay and the Boxes replaced.

Points to be Attended to After Firing.

- (a) That the Gun is unloaded.
- (b) That the Safety Catch (64) has returned to the " Safe " position.
- (c) That the Barrel (40) is cleaned out and oiled as soon as possible after firing to prevent erosion.
- (d) That the Main Spring (9) is released.
- (e) That in collecting the empty cases, there are no live cartridges amongst them.
- (f) That the Lock is taken out, the Extractor (16) and the point of the Firing Pin (5) examined, and the Springs (9, 3 and 21) tested to see that they function correctly.

NOTE :—It will not be necessary to strip the Lock to do this.

To Strip the Gun.

Remove the Feed Block (41), as previously described.

Open the Rear Cover (67) and remove the Lock.

Press the Fuzee-Spring Box (91) forward and take off the Spring Box (91), Spring (34), Links (33), Hook (34a) and Fuzee (32), removing the Fuzee (32) from the Crank (26).

Unscrew and remove the " T " Pin (58) which fixes the Handle Block (55) and turn down the Handle Block.

Pull out the Roller Bracket (81) and the left-hand Filling-in Piece (89) and remove the Muzzle Attachment Parts.

Draw the Barrel (40) and the Recoil Plates (36 and 38) out from the rear.

Unscrew the Nut (73a) from the Axis Pin (73) and remove the Axis Pin (73), Front Cover (77) and Rear Cover (67).

Unscrew and remove the Hinge Pin (57) of the Handle Block (55) and remove the Handle Block.

Unscrew the Securing Pin (84a) from the Roller Collar (84) and remove the Collar (84) and Roller (83).

Withdraw the Taper Pin (86a) from the Dead Stop (85) and remove the Dead Stop (85).

To Assemble the Gun.

Place the Dead Stop (85) in position and insert the Taper Pin (86a).

Place the Roller (83) and Roller Collar (84) in position and insert the Securing Pin (84a).

Place the Handle Block (55) in position and screw in the Hinge Pin (57).

Insert the Barrel (40), Recoil Plates (36 and 38) and Crank (26) from the rear.

Fix the Muzzle-Attachment Parts in position.

Place the Roller Bracket (81) and the left-hand Filling-in Piece (89) in position.

Turn up the Back Block (55) on its Hinge and screw in the " T " Pin (58).

Place the Fuzee (32) on the Crank Spindle and connect to the Fuzee Spring (34) by means of the Links (33) and Hook (34a), then fix the Fuzee Spring (34) to the Spring Box (91) and place all these Parts in position.

Replace the Front and Rear Covers.

Insert the Lock and close the Rear Cover.

Insert the Feed Block (41) and close the Front Cover (77).

To Strip the Feed Block.

Remove the Feed Block (41) from the Gun.

Take out the Securing Pin (52) of the Feed Block Levers (49 and 50) and remove the Upper and Lower Levers (49 and 50).

Remove the Feed-Block Slide (42), pull off the Actuating Pawls (43 and 43a) and remove the Actuating-Pawl Spring (45).

Pull out the Axis Pin (47) from the Retaining Pawls (46) and remove the Retaining Pawls (46) and Spring (48).

To Assemble the Feed Block.

Place the Retaining Pawls (46) and Spring (48) in position and insert the Axis Pin (47).

Place the Actuating-Pawl Spring (45) and the Actuating Pawls (43 and 43a) in position on the Slide (42), then insert the Slide (42) in the Feed Block (41).

Place the Upper and Lower Levers (49 and 50) in position, then insert the Securing Pin (52).

Place the Feed Block (41) in position in the Gun, taking care that the Stud on the Lower Lever (50) engages in the Recess in the left-hand Recoil Plate (38).

To Strip the Lock.

Remove the Lock from the Gun.

With the handle of the "T" Pin (58) from the Handle Block (55) press out the Side Lever Axis Pin (14) and the Spring Pin (15).

Remove the Side Lever (13) and Lifting Levers (10 and 10a) and slide off the Extractor (16).

Press the Safety Sear (2) down and fire the Lock by pulling backwards the top of the Hand Sear (7).

Press out the Tumbler-Axis Pin (11) and remove the Tumbler (6).

Press out the Hand-Sear Axis Pin (8) and remove the Hand Sear (7) and Main Spring (9).

Press the Safety Sear (2) down and shake out the Firing Pin (5), then raise the rear of the Safety Sear (2) and remove it.

Push out the Gib-Spring Shutter (22) on the Extractor (16) and remove the Gib Spring (21) and the Gib (20).

To Assemble the Lock.

Insert the Gib (20) and its Spring (21) in the Extractor (16) and slide on the Gib-Spring Shutter (22).

Insert the Safety Sear (2) and the Firing Pin (5).

Place the Tumbler (6) and its Axis Pin (11).

Place the Hand Sear (7) and its Axis Pin (8).

Slide the Extractor (16) on to the Lock Frame (1).

Put on the Lifting Levers (10 and 10a).

Put on the Side Lever (13) and secure it with the Axis Pin (14) and Spring Pin (15).

Then press the Firing Pin (5) right forward, insert the Main Spring (9) with its longer arm to the front into the top of the Lock Frame (1), in front of the Hand Sear (7) and push it downwards into position.

Cleaning and Lubrication.

When cleaning the Gun, turpentine or oil should be used. Emery cloth or any abrasive substance should *not* be used. It is a good plan before assembling the Gun, to try each Part in its place separately to see that it works freely.

The Gun should be lubricated with a thin mineral oil which will not cease to flow under low temperatures and must be free from acid, dirt, suspended matter and water.

Monthly Examination.

All Machine Guns should be thoroughly examined every month and left in a properly lubricated and serviceable condition.

The following Parts should therefore be removed, properly cleaned and re-oiled (or greased) :—

Lock, Feed Block (41), Fuzee (32), Spring Box (91), Fuzee Spring (34), Handle Block (55), Roller Bracket (81), Left Hand Filling-in Piece (89), Dead Stop (85), Muzzle Attachment Parts (129, 130, 131, 132, 133 and 134), Barrel (40), Recoil Plates (36 and 38) and Crank (26).

Object of Spare Lock.

The Spare Lock is provided to readily replace the Lock in the Gun, in the event of a broken Main Spring (9), or Firing Pin (5). The exchange of Locks is so readily effected that the Gun is only a few seconds out of action.

FAILURES THAT MAY OCCUR AND HOW TO REMEDY THEM.

The Vickers Automatic Gun has the advantage of having all its Mechanism in two principal components, namely, the Feed Block and the Lock.

The Feed Block (41) can be cleared readily in the event of a Stoppage, but, should the fault lie with the Lock, it is so easy to remove and replace by a spare one that this is the usual course to adopt.

When a Stoppage occurs, it is only necessary to know which of the two Parts named is responsible and to act as suggested.

Stoppages during firing may be classed under two headings :—

(1) PROLONGED, which are due to :—

Failure of some Part which cannot be put right immediately and which, necessarily, puts the Gun out of action for a more or less prolonged period.

Such stoppages, which are very unlikely to occur, might be caused either by :—

- (a) Loose or Broken Muzzle Attachments ;
- (b) Broken Fuzee, or Broken Fuzee Spring.

In the event of either of the above, the loose or broken Part must, of course, be tightened up or replaced, when the Gun will again fire correctly.

(2) TEMPORARY, which are due to :—

- (a) Failure in the Lock or Faulty Ammunition ;
- (b) Some cause which can generally be avoided by a high standard of training and a thorough knowledge of the Gun by the Gunner.

It is obvious that to clear Stoppages, the Gunner must be thoroughly trained in the Mechanism of the Gun and the possible causes of the various Stoppages.

In order to minimise these Stoppages, the Ammunition should be carefully examined and only correct Rounds filled into the Belts.

TEMPORARY STOPPAGES

The following Table of Temporary Stoppages, set out in three columns, gives a clear indication of the cause of and the remedy for each Stoppage.

Column 1. Shows the four approximate positions of the Crank Handle in which the Gun may stop firing.

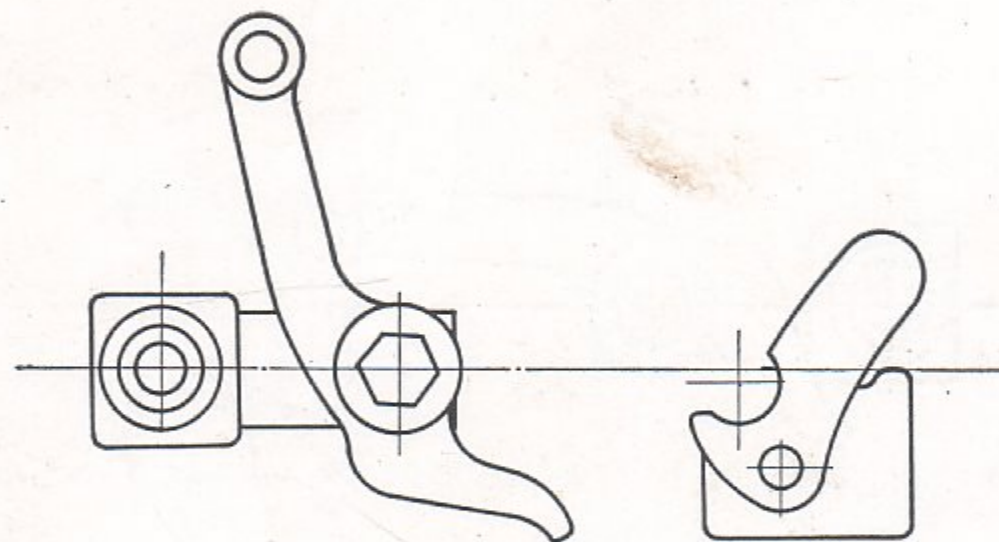
The position of the Handle affords a ready indication of the correct remedy to be applied.

Column 2. Gives the Cause of the Stoppage.

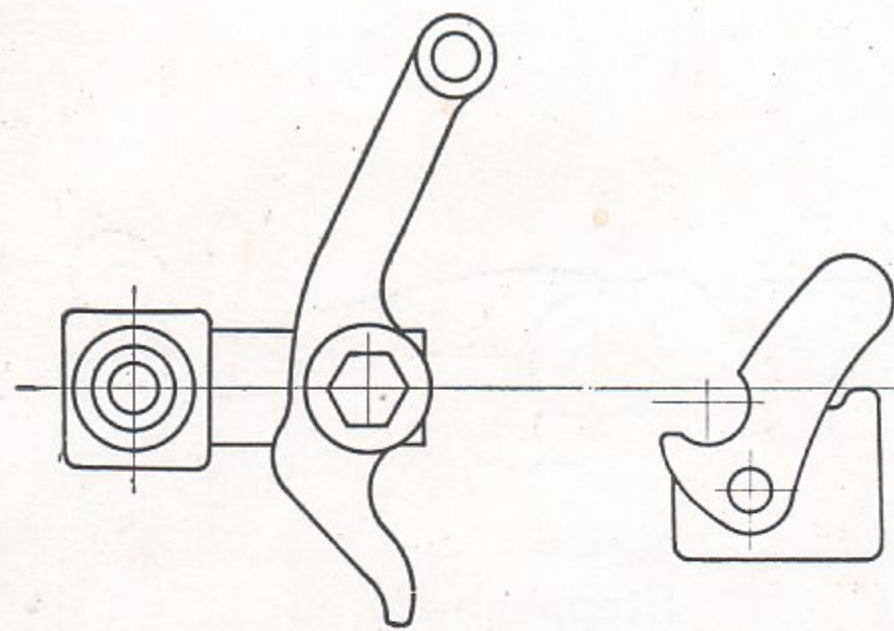
Column 3. Gives the Remedy necessary to prevent a recurrence of the Stoppage.

TABLE OF TEMPORARY STOPPAGES

1	2	3
Position of the Crank Handle	Cause	Remedy
<p>Stoppage No. 1</p> <p style="text-align: center;"><i>See Plate opposite</i></p> <p>(The Lock has not been withdrawn sufficiently to allow the Extractor to drop).</p>	<p>(1) Deteriorated Ammunition</p> <p>(2) Fuzee Spring has too much tension.</p> <p>(3) Cartridges too tight in the Belt.</p> <p>(4) Insufficient lubrication</p> <p>(5) Excessive friction due to congealed oil, or frozen water in the Water Jacket</p>	<p>(1) Inspection of Ammunition</p> <p>(2) Reduce tension by turning Fuzee Spring Tension Screw</p> <p>(3) & (4) Compliance with the "Points before Firing"</p> <p>(5) Repeat firing until Gun is warmed up</p>
<p>Stoppage No. 2</p> <p style="text-align: center;"><i>See Plate opposite</i></p> <p>(The Extractor has dropped, but is unable to go forward)</p>	<p>(1) Separated Case, with front portion wedged on an undamaged Cartridge</p> <p>(2) Separated Part of the Case in the Chamber</p> <p>(Note.—A series of separated Cases indicates excessive head space between the face of the Extractor and the face of the Barrel)</p>	<p>(1) Draw back the Crank Handle, until the Horns of the Extractor are retained by the Steps on the Side Cams. Push out the Cartridge from the Extractor</p> <p>Draw back the Crank Handle and release</p> <p>Reload and Fire</p> <p>(2) Use the Clearing Plug to remove the separated Case. Reload and fire</p> <p>(Note.—If separated Cases are persistent, change the Lock. If still persistent, adjusting washers should be placed behind the nut on the Connecting Rod, to obtain correct head space)</p>

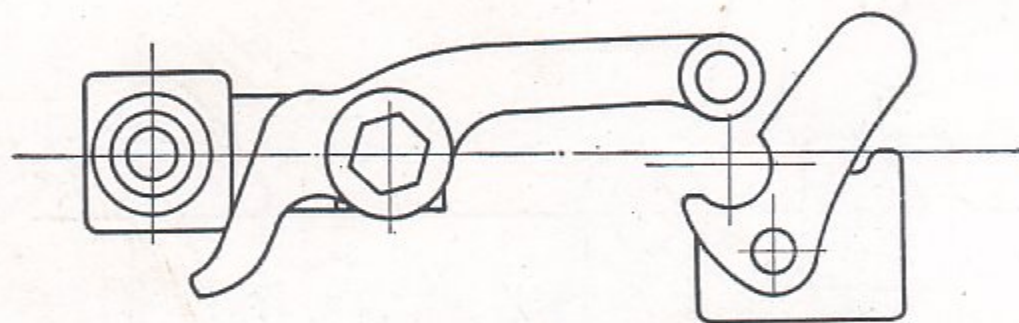


Stoppage No. 1.

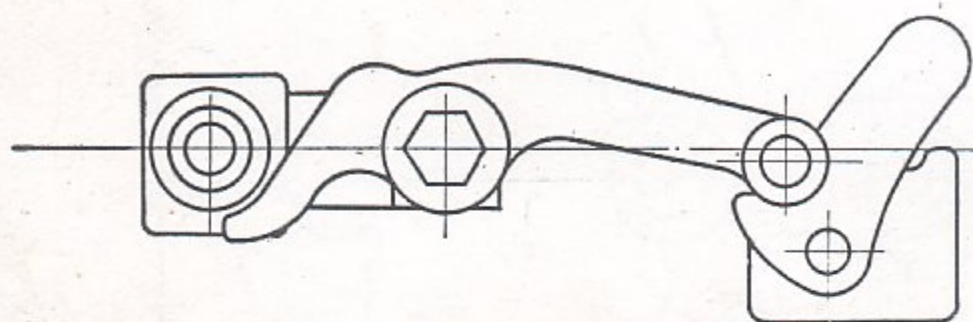


Stoppage No. 2.

**Approximate Positions of Crank Handle for Stoppages
Nos. 1 & 2.**



Stoppage No. 3.



Stoppage No. 4.

**Approximate Positions of Crank Handle for Stoppages
Nos. 3 & 4.**

TABLE OF TEMPORARY STOPPAGES (continued)

1	2	3
Position of the Crank Handle	Cause	Remedy
<p>Stoppage No. 3</p> <p><i>See Plate opposite</i></p> <p>(The Extractor has not risen to the Firing position, or the Feed Mechanism is jammed)</p>	<p>(1) Excessive Friction due to congealed Oil</p> <p>(2) Friction on the face of the Lock obstructing the upward movement of the Extractor</p> <p>(3) Faulty Feed</p> <p>(4) Fuzee Spring too weak</p>	<p>Strike down sharply on the Crank Handle with a glancing blow, to prevent injuring the hand, and Fire</p> <p><i>If this fails, proceed as follows:—</i></p> <p>(1) Repeat Firing until the Gun is warmed up</p> <p>(2) Draw back the Crank Handle until the Horns of the Extractor are retained by the Steps on the Side Cams Examine these Parts and see that they are well oiled</p> <p>(3) [a] Draw back the Crank Handle until the Horns of the Extractor are retained by the Steps on the Side Cams. Examine the Feed Block and pull the Belt into the correct position in the Feed Block</p> <p>[b] Draw back the Crank Handle and release</p> <p>[c] Fire</p> <p>(4) Increase the initial tension on the Spring</p>
<p>Stoppage No. 4</p> <p><i>See Plate opposite</i></p> <p>(Cartridge has not been fired)</p>	<p>(1) Misfire (Defective Ammunition)</p> <p>(2) Broken or Damaged Firing Pin</p> <p>(3) Broken or Damaged Main Spring</p> <p>(4) Empty pocket in Ammunition Belt</p>	<p>(1) [a] Draw back the Crank Handle. Pull the Ammunition Belt from right to left. Release the Crank Handle. This action ejects the faulty Cartridge and puts a fresh one in the Barrel</p> <p>[b] Fire</p> <p>(2) } Unload and remove the Lock & }</p> <p>(3) } Replace by a spare one. Re-load. Fire</p> <p>(4) Reload the Gun and Fire</p>

LIST OF PARTS

Part No.
on Arrgt.

NOMENCLATURE

1	..	..	Lock Frame.
2	..	..	Safety Sear.
3	..	..	Safety-Sear Spring.
4	..	..	Safety-Sear Axis Pin (permanently assembled to the Lock Frame).
5	..	..	Firing Pin.
6	..	..	Tumbler.
7	..	..	Hand Sear.
8	..	..	Hand-Sear Axis Pin.
9	..	..	Main Spring.
10	..	..	Lifting Lever, R.H.
10a	..	..	Lifting Lever, L.H.
11	..	..	Lifting Lever and Tumbler-Axis Pin.
12	..	..	Lower Stop for Lifting Levers (part of Lock Frame).
13	..	..	Side Lever.
14	..	..	Side-Lever Axis Pin.
15	..	..	Side-Lever-Axis-Pin Spring Pin.
16	..	..	Extractor.
17	..	..	Horns of Extractor (part of Extractor).
18	..	..	Upper Stop for Extractor (part of Lock Frame).
19	..	..	Groove, for Extractor-Holding-Up Spring (cut in the Extractor).
20	..	..	Gib.
21	..	..	Gib Spring.
22	..	..	Gib-Spring Shutter.
23	..	..	Connecting Rod.
24	..	..	Connecting-Rod Adjusting Nut.
25	..	..	Connecting-Rod Adjusting Washer.
26	..	..	Crank.
26a	..	..	Retaining Spring (permanently assembled to the Crank).
27	..	..	Crank Pin.
27a	..	..	Crank-Pin Securing Pin.
28	..	..	Crank Axis.
29	..	..	Crank Handle.

LIST OF PARTS (continued),

Part No. on Arrgt.	NOMENCLATURE	
30	Crank-Handle Knob (permanently assembled to the Crank Handle).
31	Crank-Handle Securing Screw.
32	Fuzee.
33	Fuzee Links (permanently assembled to Fuzee).
34	Fuzee Spring.
34a	Fuzee-Spring Hook.
34b	Fuzee-Spring Nut.
35	Fuzee-Spring Tension Screw.
35a	Fuzee-Spring Tension-Screw Vice Handle (permanently assembled to the Fuzee-Spring Tension Screw).
36	Recoil Plate, R.H.
37	Extractor-Holding-up Spring, R.H. (permanently assembled to the R.H. Recoil Plate).
37a	Guides on Recoil Plate (part of Recoil Plate).
38	Recoil Plate, L.H.
38a	Guides on Recoil Plate (part of Recoil Plate).
39	Extractor-Holding-up Spring, L.H. (permanently assembled to the L.H. Recoil Plate).
39a	Extractor-Holding-up Spring Rivets.
40	Barrel.
40a	Cannelure for Asbestos Packing (cut round the Barrel).
41	Feed Block.
41a	Bullet-Guide Spring (this is fitted for use with Rimless Cartridges only).
42	Feed-Block Slide.
43	Actuating Pawl (front).
43a	Actuating Pawl (rear).
44	Actuating-Pawl Axis Pin.
45	Actuating-Pawl Spring.
46	Retaining Pawls.
46a	Retaining-Pawls Finger Plate (permanently assembled to the Retaining Pawls).
47	Retaining-Pawls Axis Pin.
48	Retaining-Pawls Spring.
49	Feed-Block Lever (upper).

LIST OF PARTS (continued).

Part No. on Arrgt.			NOMENCLATURE
50	..	..	Feed-Block Lever (lower).
52	..	..	Feed-Block-Lever Securing Pin.
53	..	..	Feed-Block Cartridge Guide and Stop (permanently assembled to the Feed Block).
55	..	..	Handle Block.
55a	..	..	Oil Brush Head.
55b	..	..	Oil Brush.
55c	..	..	Handle-Block Oil Reservoir.
55d	..	..	Oil Brush Retaining Spring (permanently assembled to the Handle Block.)
56	..	..	Handle-Block Handles.
57	..	..	Handle-Block Hinge Pin.
58	..	..	Handle-Block Securing Pin.
58a	..	..	Handle Block Securing Pin Snib.
58b	..	..	Handle Block Securing Pin Spring.
59	..	..	Trigger.
59a	..	..	Thumb Press (permanently assembled to the Trigger).
60	..	..	Trigger Axis Pin.
61	..	..	Trigger Pawl.
62	..	..	Trigger-Pawl Axis Pin.
63	..	..	Trigger Lever.
64	..	..	Safety Catch.
65	..	..	Safety-Catch Axis Pin.
66	..	..	Safety-Catch and Trigger-Lever Spring.
66a	..	..	Safety-Catch and Trigger-Lever-Spring Piston.
67	..	..	Rear Cover.
68	..	..	Rear-Cover Catch.
69	..	..	Rear-Cover-Catch Axis Pin.
70	..	..	Rear-Cover-Catch Spring.
70a	..	..	Rear-Cover-Catch-Spring Guide Stud (permanently assembled to the Rear Cover).
71	..	..	Rear-Cover Lock Frame Grooves (cut in Rear Cover).
72	..	..	Rear-Cover-Extractor Guides (permanently assembled to the Rear Cover).
73	..	..	Rear-Cover and Front-Cover Axis Pin.
73a	..	..	Rear-Cover and Front-Cover-Axis-Pin Nut.

LIST OF PARTS (continued).

Part No. on Arrgt.	NOMENCLATURE
73b	Rear-Cover and Front-Cover-Axis-Pin Split Pin.
74	Trigger Bar.
75	Trigger-Bar Spring.
76	Trigger-Bar Rear Projection (part of Trigger Bar).
77	Front Cover.
78	Front-Cover Catch (permanently assembled to the Front Cover).
78a	Front-Cover-Catch Snib.
78b	Front-Cover-Catch-Snib Spring.
78c	Front-Cover-Catch Cap.
79	Front-Cover-Catch Locking Pin.
80	Side Plate, R.H. (permanently assembled to the Trunnion Block).
81	Roller Bracket.
82	Side-Plate (R.H.) Side Cam (permanently assembled to the R.H. Side Plate).
83	Roller.
84	Roller Collar.
84a	Roller-Collar Securing Pin.
85	Dead Stop.
86	Dead-Stop Bracket (permanently assembled to the R.H. Side Plate).
86a	Dead-Stop Taper Pin.
88	Side Plate, L.H. (permanently assembled to the Trunnion Block).
89	Side-Plate (L.H.) Filling-in Piece.
90	Side-Plate (L.H.) Side Cam (permanently assembled to the L.H. Side Plate).
91	Fuzee-Spring Box.
92	Bottom Plate (permanently assembled to the Side Plates).
92a	Bottom-Plate Shutter.
92b	Bottom-Plate-Slide Catch.
92c	Bottom-Plate-Slide-Catch Spring.
92d	Bottom-Plate-Slide-Catch Stop.
92e	Bottom-Plate-Slide-Catch Stop Pin.

LIST OF PARTS (continued).

Part No. on Arrgt.			NOMENCLATURE
93	..	..	Trunnion Block.
93a	..	..	Trunnion-Block Distance Piece (permanently assembled to the Trunnion Block).
94	..	..	Water Jacket (permanently assembled to the Trunnion Block).
95	..	..	Water-Jacket End Cap (permanently assembled to the Water Jacket).
96	..	..	Water-Jacket-End-Cap Stuffing Box (permanently assembled to the End Cap).
98	..	..	Steam Tube.
99	..	..	Steam-Tube Slide Valve (permanently assembled to the Steam Tube).
100	..	..	Steam-Tube Socket (rear) (permanently assembled to the Trunnion Block).
101	..	..	Steam-Tube Plug (rear) (permanently assembled to the Steam Tube).
102	..	..	Steam-Tube Plug (front) (permanently assembled to the Steam Tube).
103	..	..	Steam-Tube-Plug (front) Fixing Screw.
104	..	..	Steam-Outlet Tube (permanently assembled to the End Cap).
105	..	..	Filling Plug.
106	..	..	Filling-Plug Chain.
106a	..	..	Eye Screws, for Chains (3).
107	..	..	Drain Plug.
108	..	..	Drain-Plug Chain.
109	..	..	Cork Plug.
109a	..	..	Cork-Plug Stem.
109b	..	..	Cork-Plug-Stem Washer.
109c	..	..	Cork-Plug-Stem-Washer Fixing Pin.
109d	..	..	Hose Connection (permanently assembled to the End Cap).
110	..	..	Cork-Plug Chain.
111	..	..	Asbestos Packing.
129	..	..	Muzzle-Attachment Packing Gland.
130	..	..	Muzzle-Attachment Sleeve.
131	..	..	Muzzle-Attachment-Sleeve Securing Pin.
131a	..	..	Muzzle-Attachment-Sleeve-Securing-Pin Chain.
132	..	..	Muzzle-Attachment Front Disc.

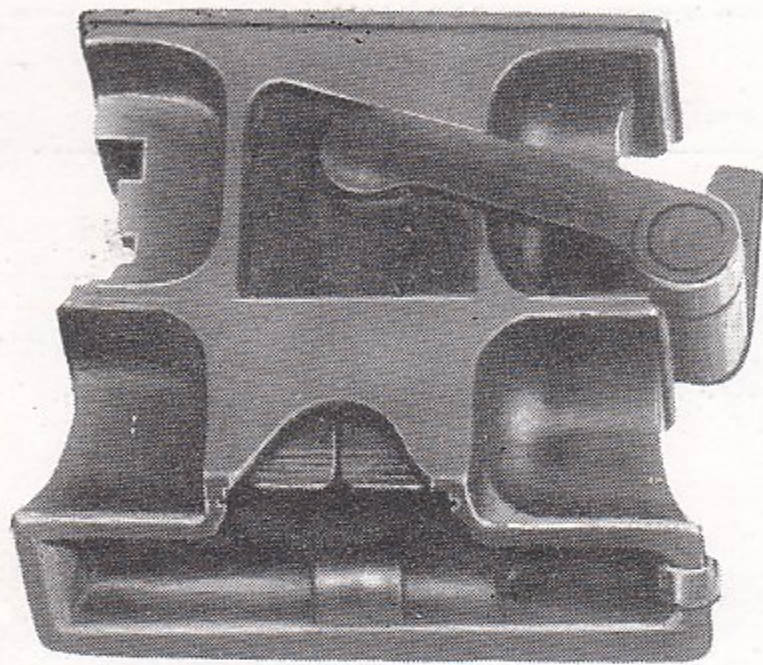
LIST OF PARTS (continued)

Part No. on Arrgt.	NOMENCLATURE
I33	Muzzle-Attachment-Front-Disc Cap.
I34	Barrel Disc.
I41	Rear Sight Stem (with Rack).
I42	Rear-Sight-Stem Axis Pin.
I43	Rear-Sight-Stem Plunger.
I44	Rear-Sight-Stem Plunger Spring.
I45	Rear-Sight Graduation Strip.
I46	Rear-Sight Carriage.
I47	Rear-Sight Carriage Pinion.
I48	Rear-Sight-Carriage Clamping Strip.
I49	Rear-Sight-Carriage Clamping Screw (with Split Pin).
I50	Rear-Sight-Carriage Clamping Nut.
I51	Rear-Sight-Carriage Friction Spring.
I52	Graduation-Strip Securing Screw (Top).
I52a	Graduation-Strip Securing Screw (Bottom).
I53	Foresight.
I53a	Foresight Bracket (permanently assembled to the End Cap).

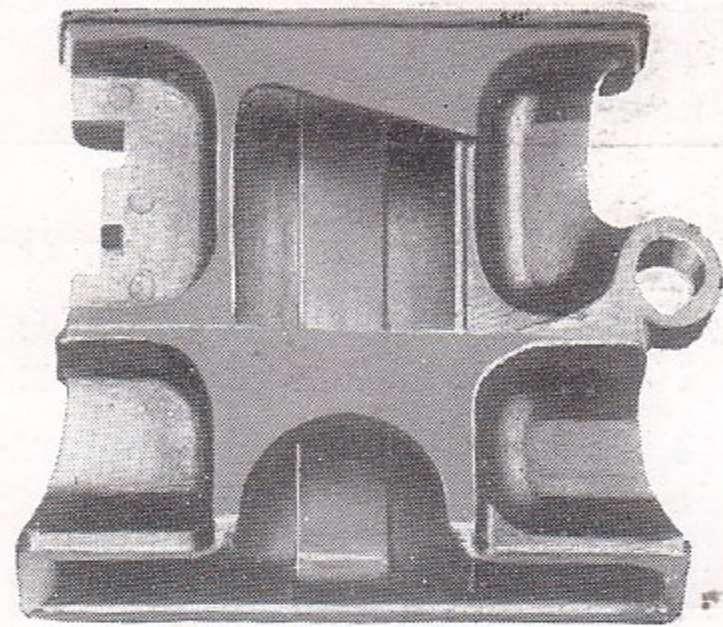
ACCESSORIES.

I73	Ammunition Belt.
I74	Ammunition Box.
I75	Anti-Aircraft Foresight Clamping Bracket.
I76	Anti-Aircraft Foresight Clamping Screw.
I77	Anti-Aircraft Foresight Clamp Axis Pin (with Washer and Split Pin).
I78	Anti-Aircraft Foresight Clamp Washer.
I81	Anti-Aircraft Foresight.
I82	Anti-Aircraft Foresight Axis Pins.
I83	Anti-Aircraft Foresight Springs.
I84	Anti-Aircraft Foresight Washers (with Split Pins).
I85	Steam Hose Pipe, with clips.
I86	Belt-Filling Machine.

NOTE.—When ordering New Parts, the Part Number, Nomenclature and number of this Handbook (M.4/2) should be carefully quoted.

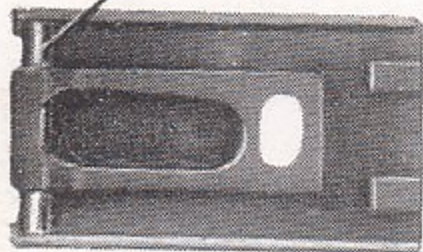


ASSEMBLY OF
FEED BLOCK.

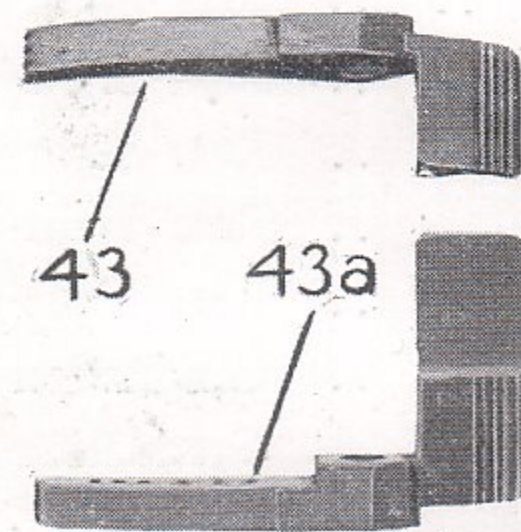


41
FEED BLOCK.

44 AXIS PIN.



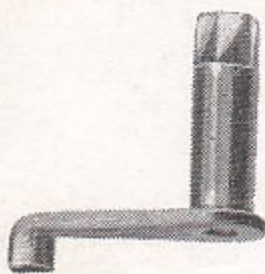
42
SLIDE.



43 & 43a
ACTUATING PAWLS.



45
SPRING.



50
LOWER LEVER.



49
UPPER LEVER.



52
SECURING PIN.



46 & 46a
RETAINING PAWLS.



48
SPRING.

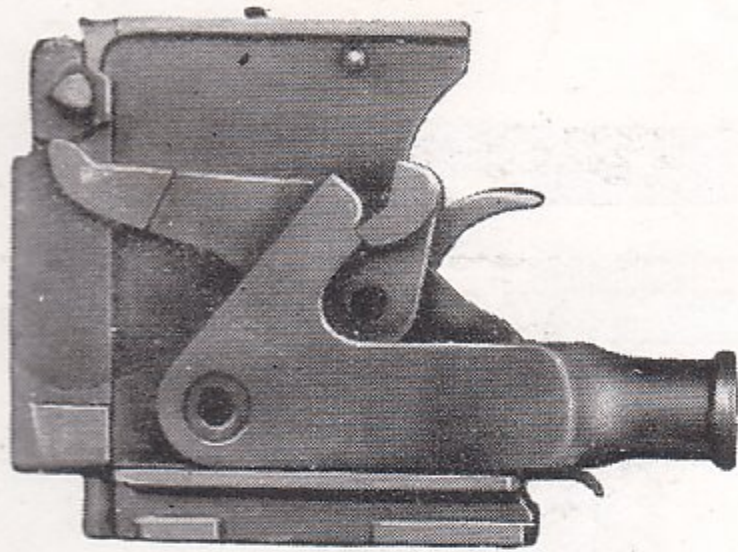


47 AXIS PIN.

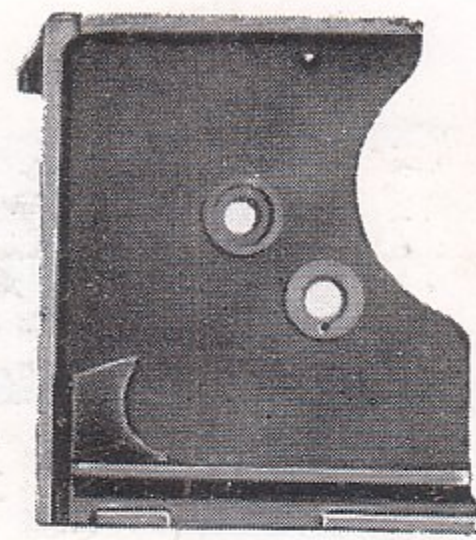


41a
BULLET-GUIDE SPRING.

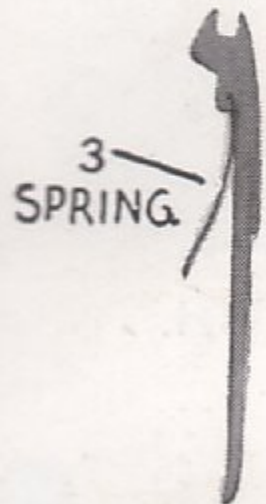
Plate 1. Assembly and Details of Feed Block.



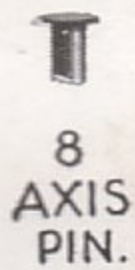
ASSEMBLY OF LOCK.



LOCK FRAME.



2
SAFETY
SEAR.



8
AXIS
PIN.



5
FIRING PIN.



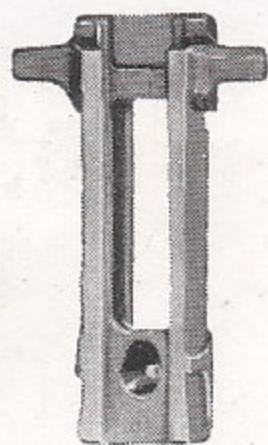
6
TUMBLER.



11
AXIS
PIN.



7
HAND SEAR.



16
EXTRACTOR.



20
GIB.



21
SPRING.



22
SHUTTER.

ASSEMBLED TO EXTRACTOR.



10
LIFTING
LEVER.



10a
LIFTING
LEVER.



13
SIDE LEVER.



14
AXIS
PIN.



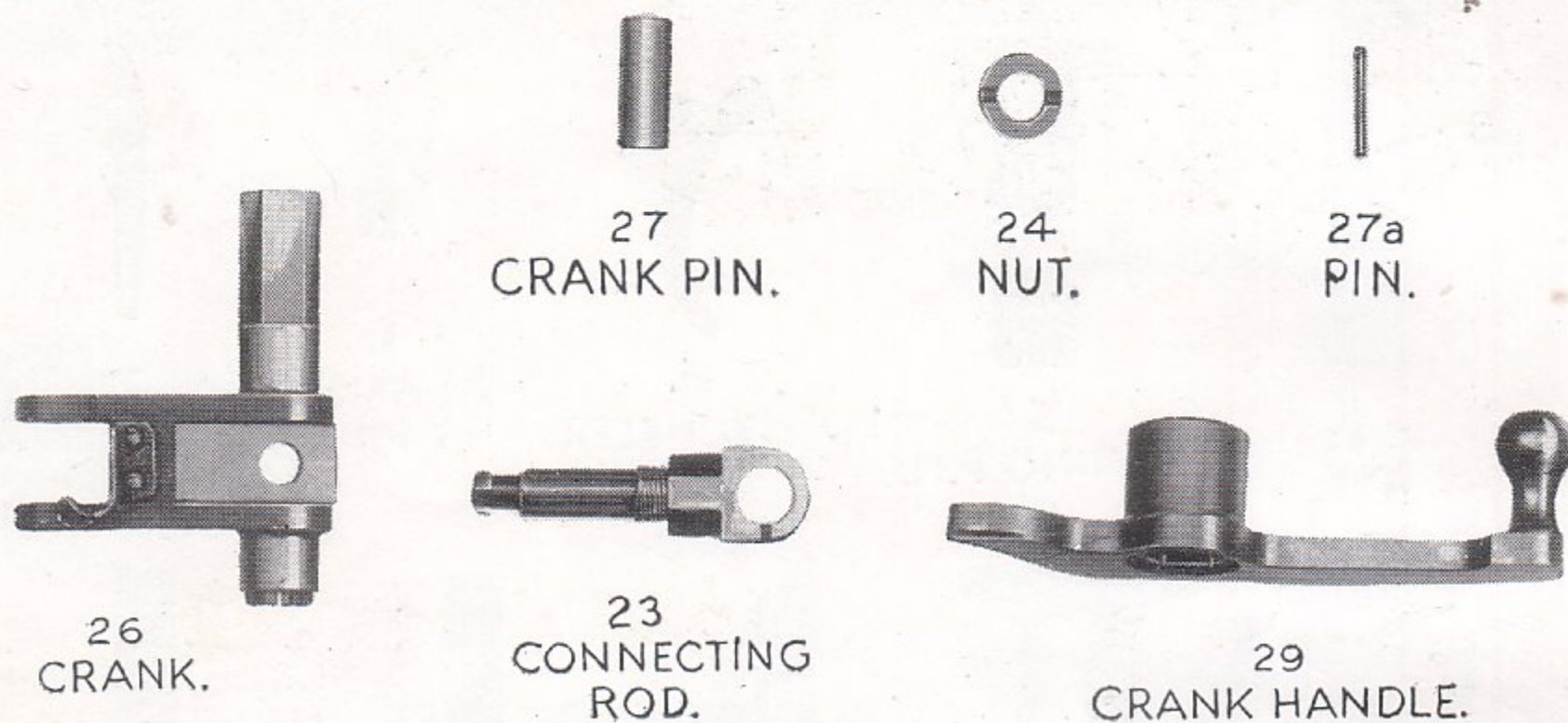
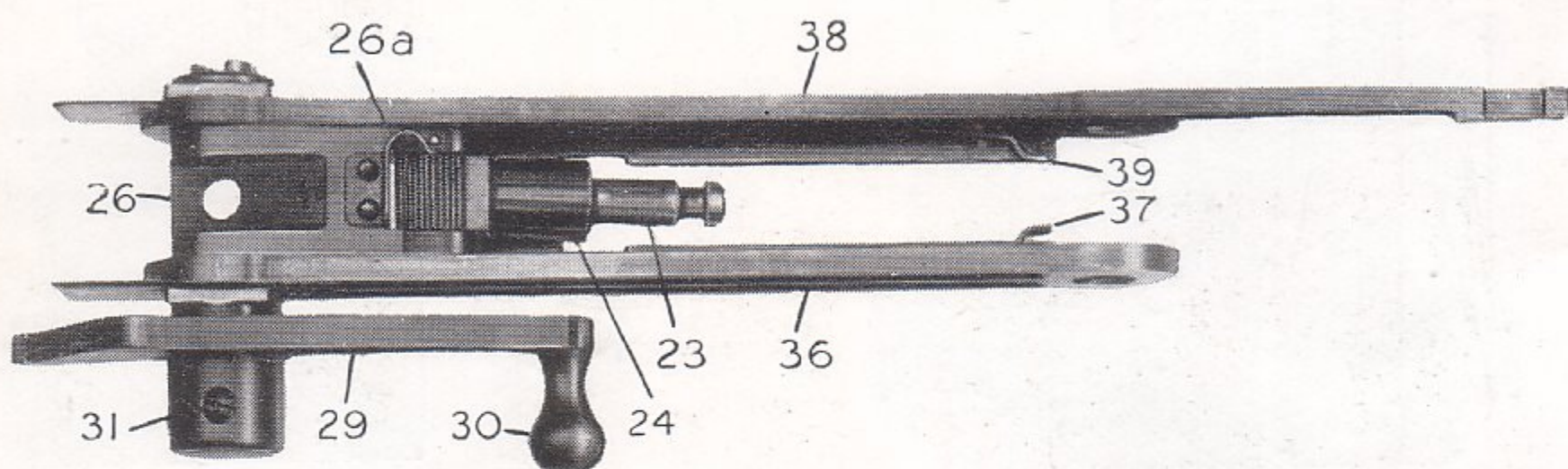
15
SPRING PIN.



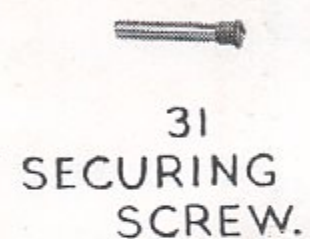
9
MAIN
SPRING.

Plate 2. Assembly and Details of Lock.

Parts arranged in order of assembly.



36
RECOIL PLATE (R H).



38
RECOIL PLATE (L H).

Plate 3. Assembly and Details of Recoiling Parts.

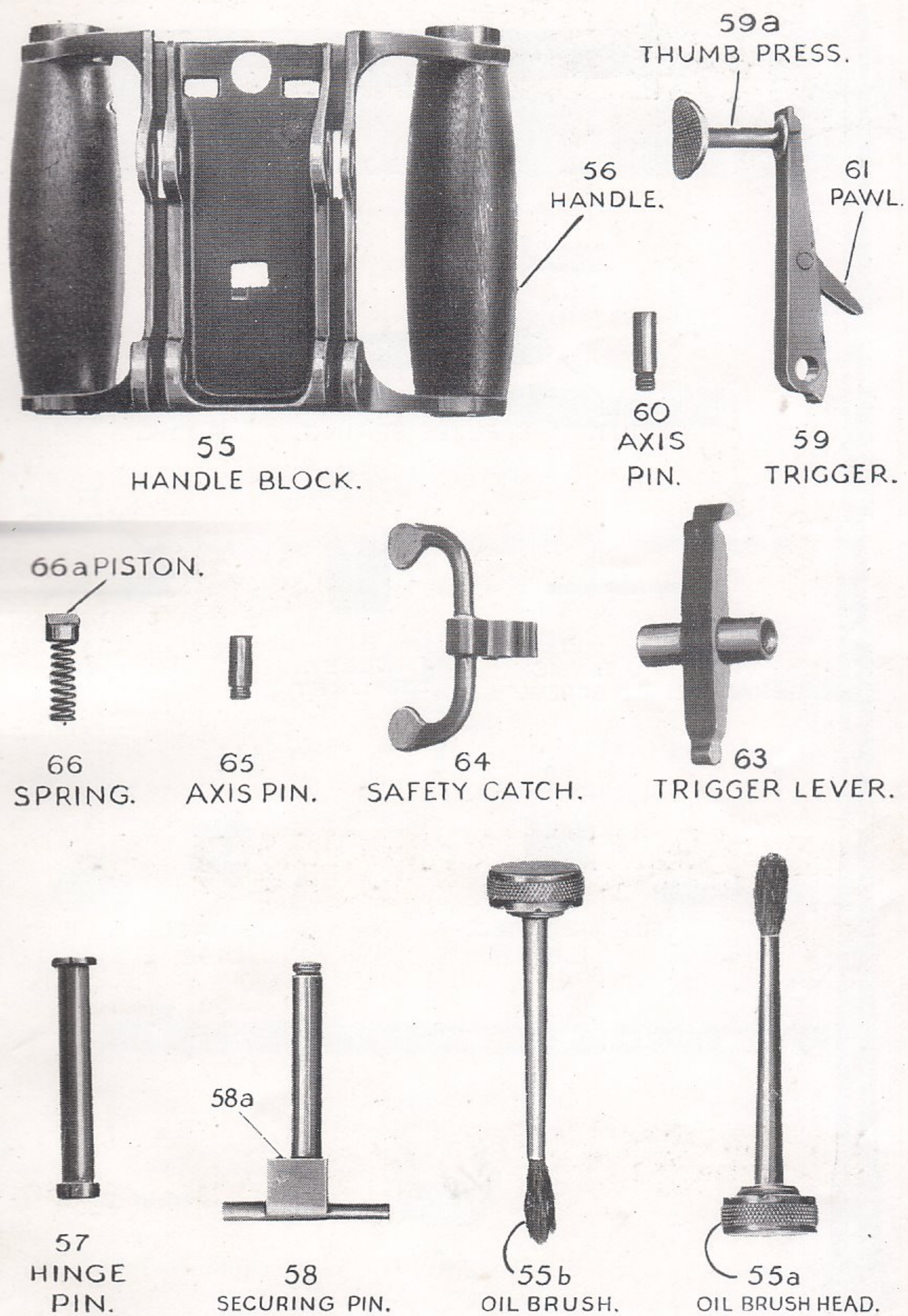


Plate 4. Details of Handle Block.

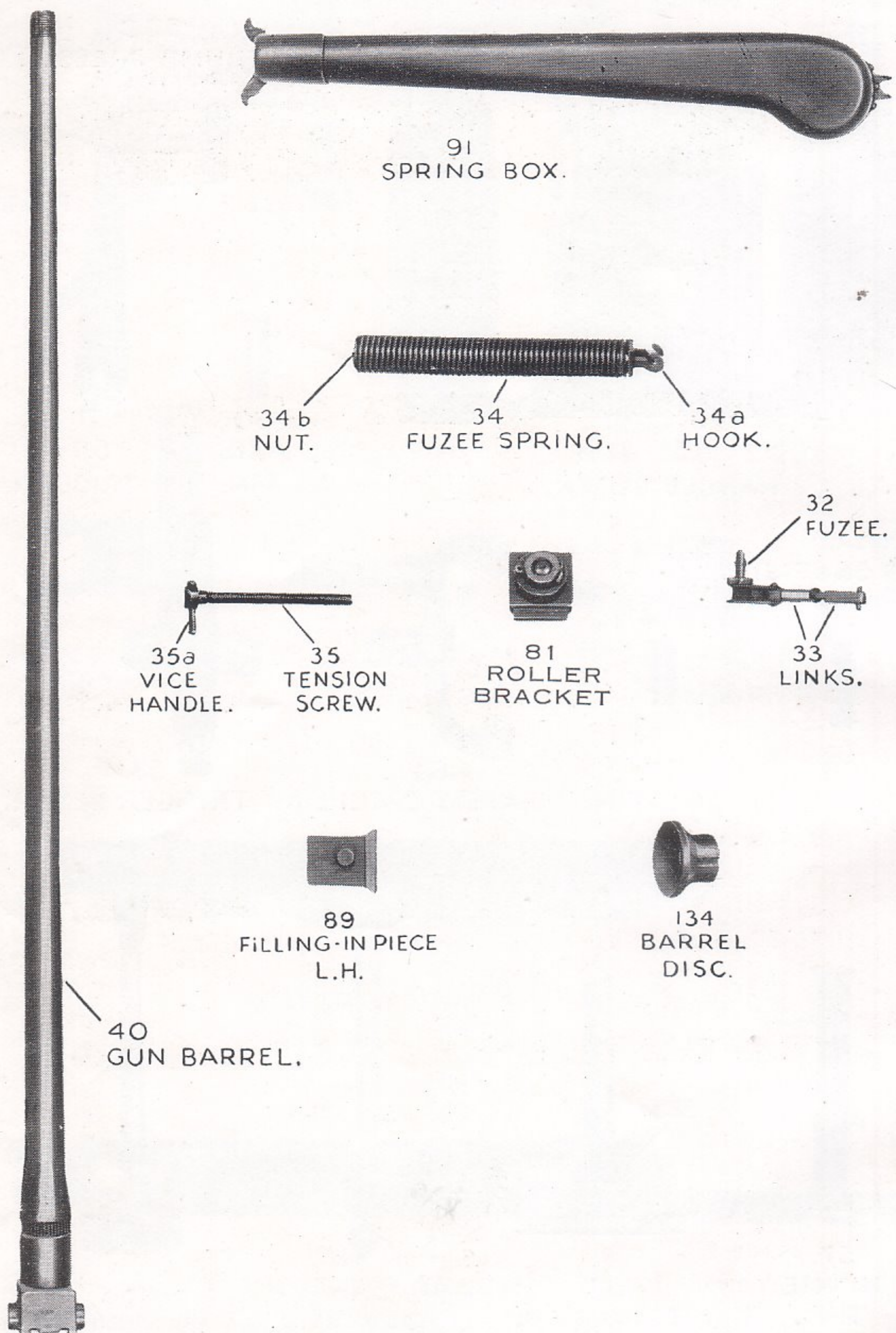
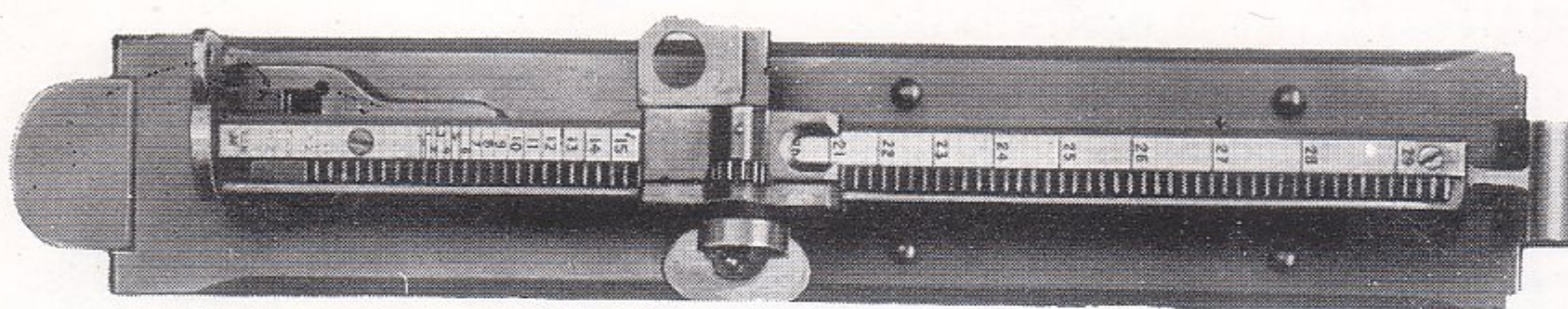


Plate 5. Gun Barrel with Fuzee Spring and Details.



ASSEMBLY OF REAR SIGHT.



144
SPRING.



143
PLUNGER



142
AXIS
PIN.



141 REAR SIGHT STEM.



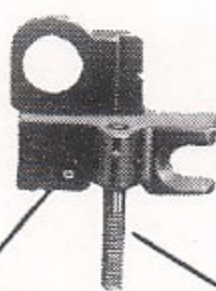
145 GRADUATION STRIP



151
FRICTION
SPRING.



152a
SCREW.



146
CARRIAGE.

149
CLAMPING
SCREW



147
PINION.



148
STRIP.



150
NUT.



SPLIT
PIN.



152
SCREW.



70
CATCH SPRING.



74
TRIGGER BAR.



75
TRIGGER-BAR SPRING.



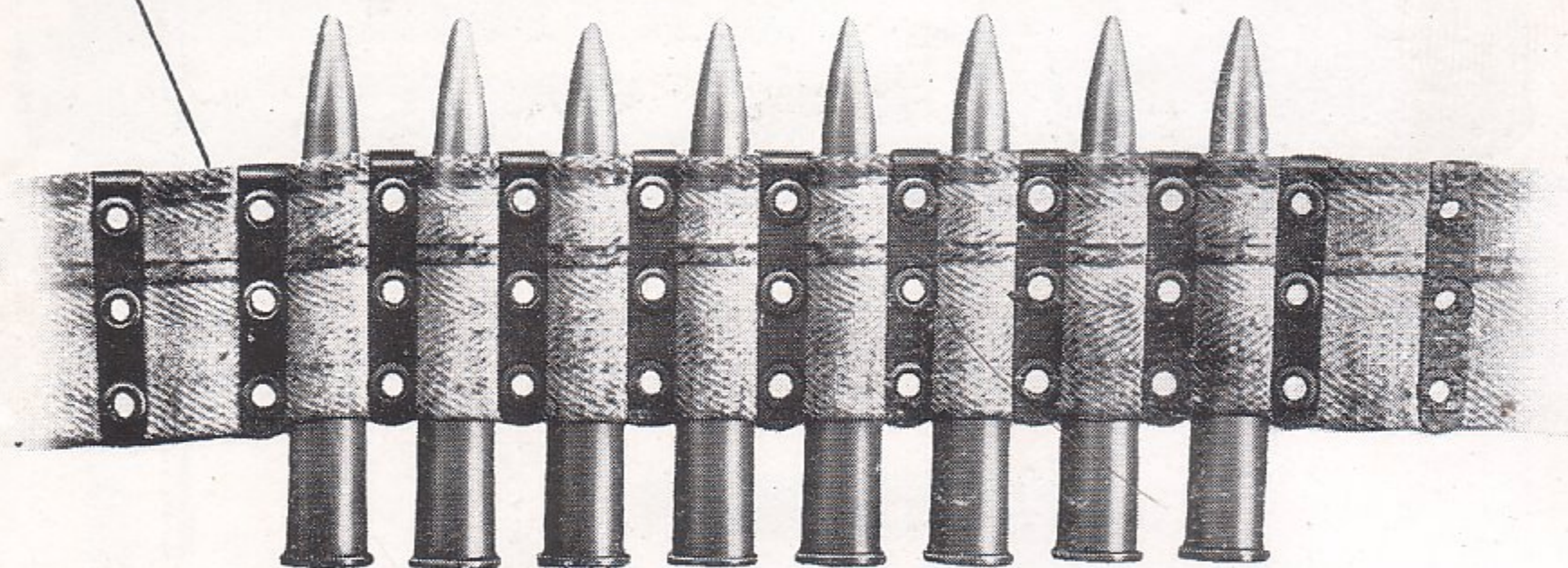
68
CATCH.



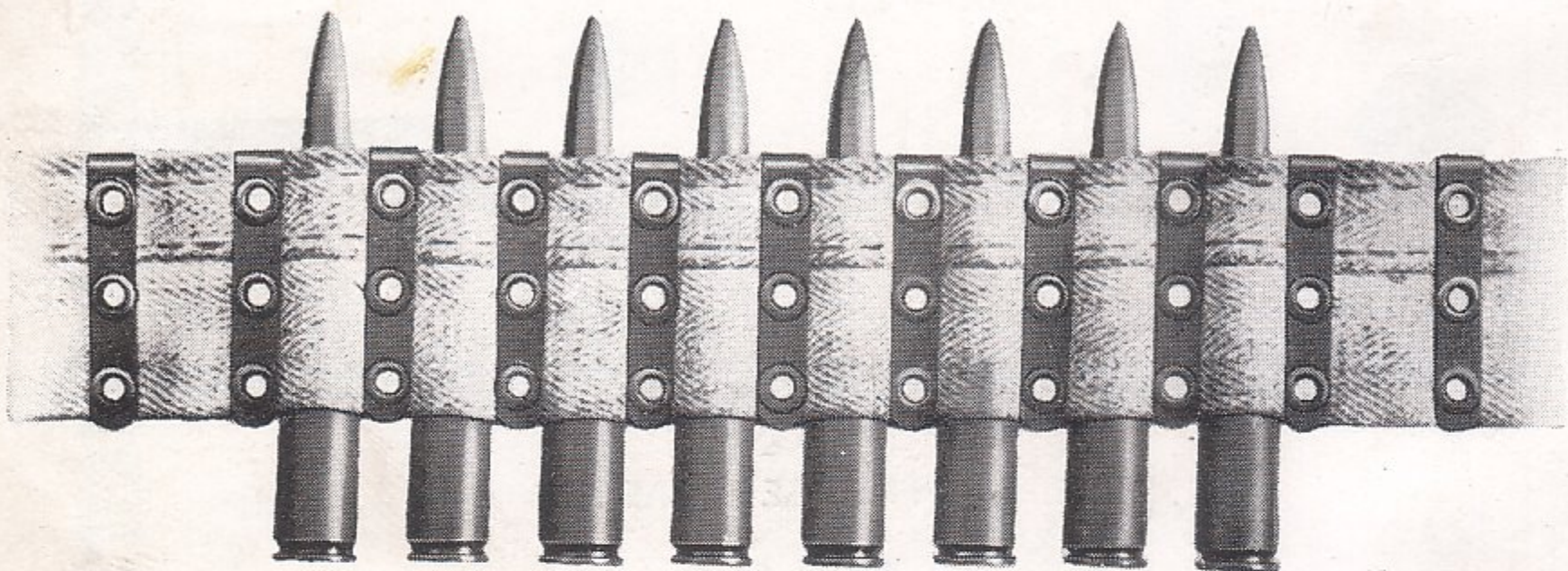
69
AXIS PIN.

Plate 6. Assembly and Details of the Rear Sight for Surface Fire.

CANVAS BELT FOR CARTRIDGES.



Rim Cartridges.



Rimless Cartridges.

Plate 7. Types of Cartridges (in Belt).

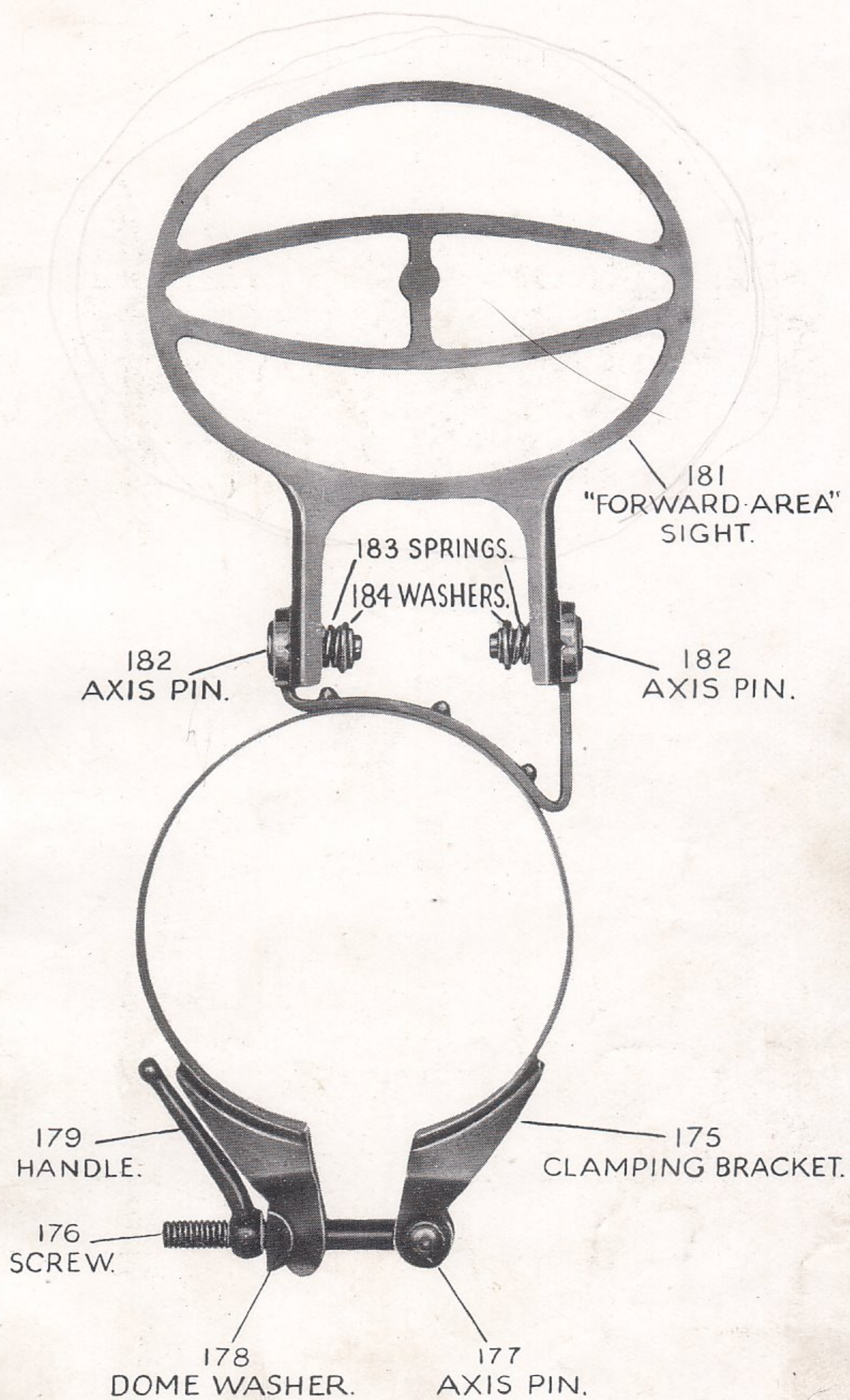
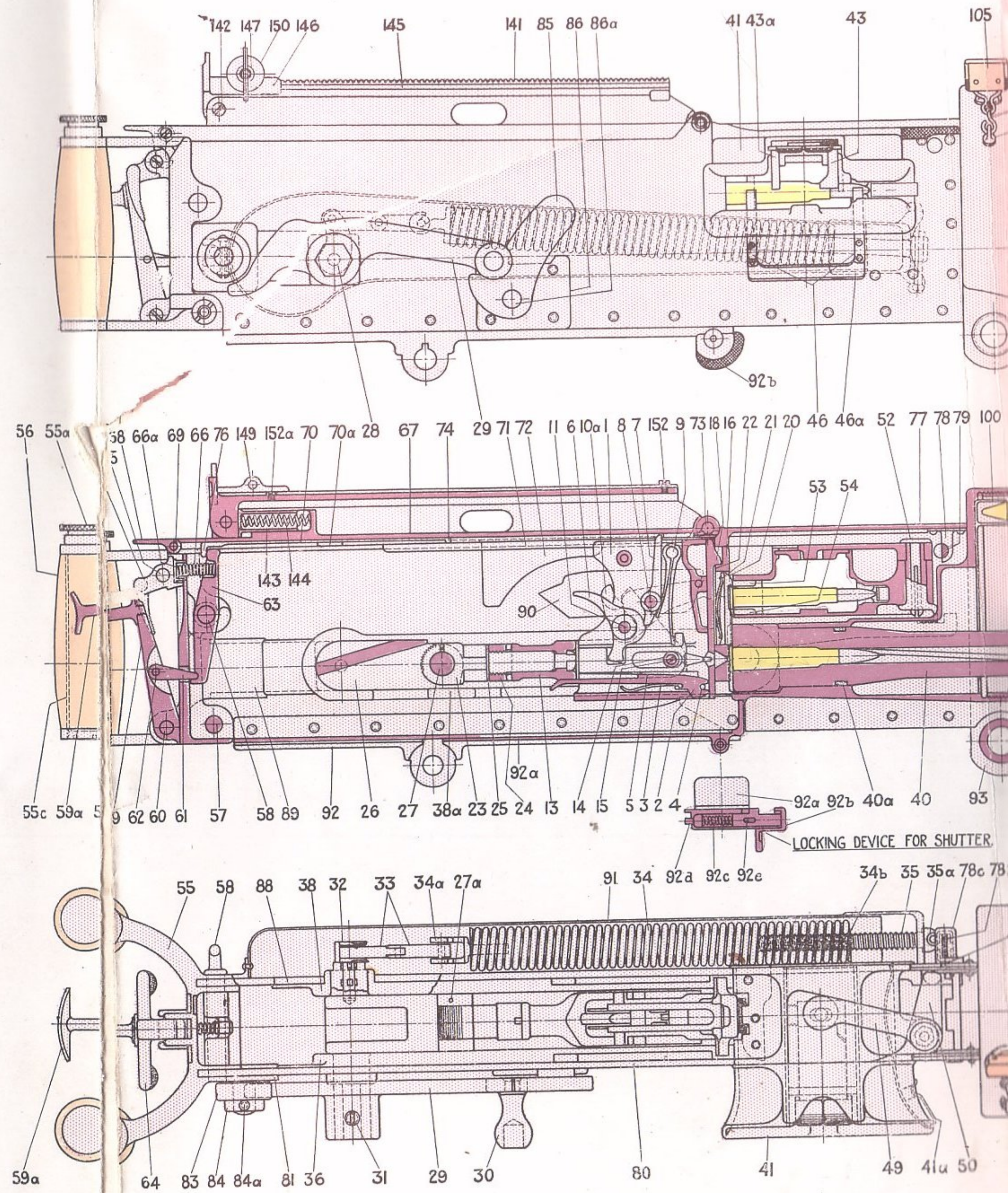
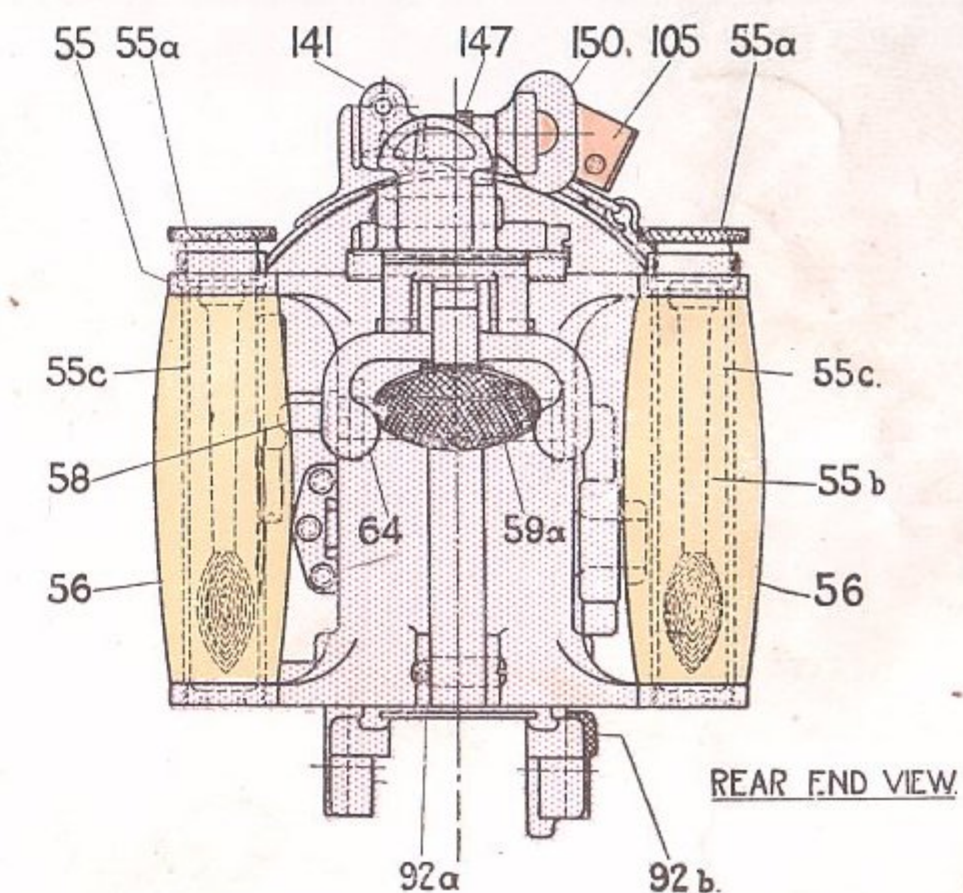
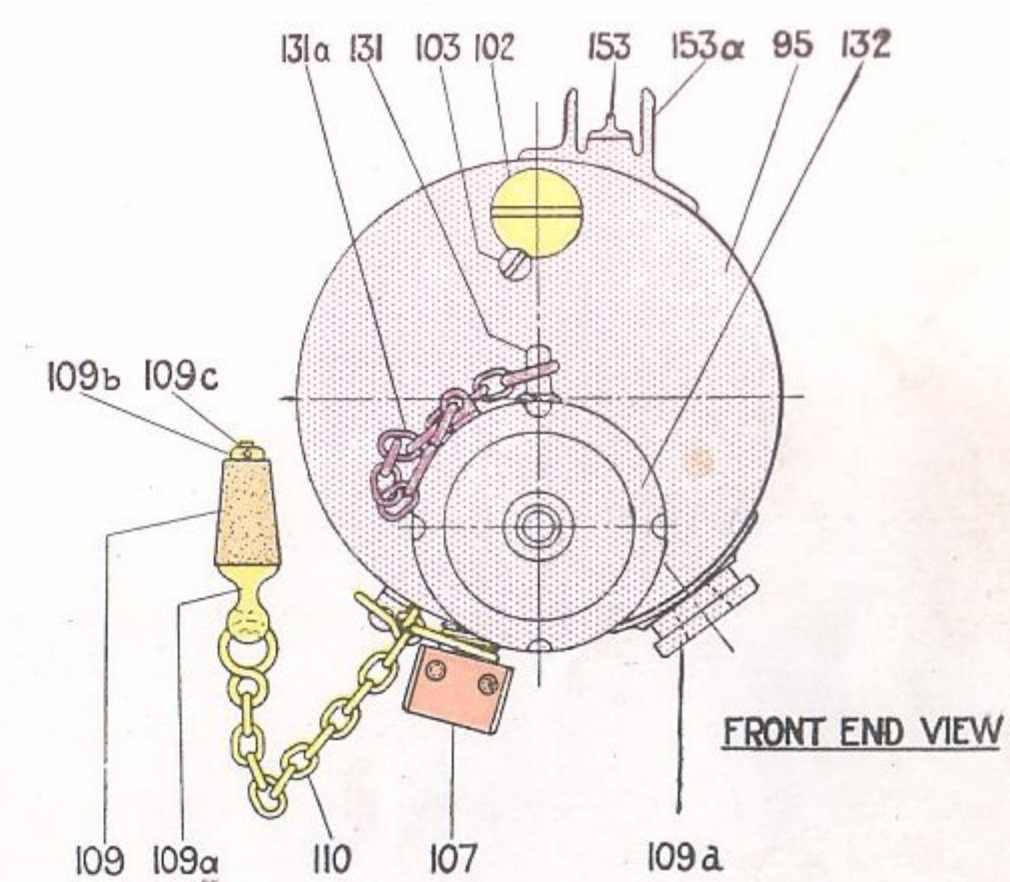
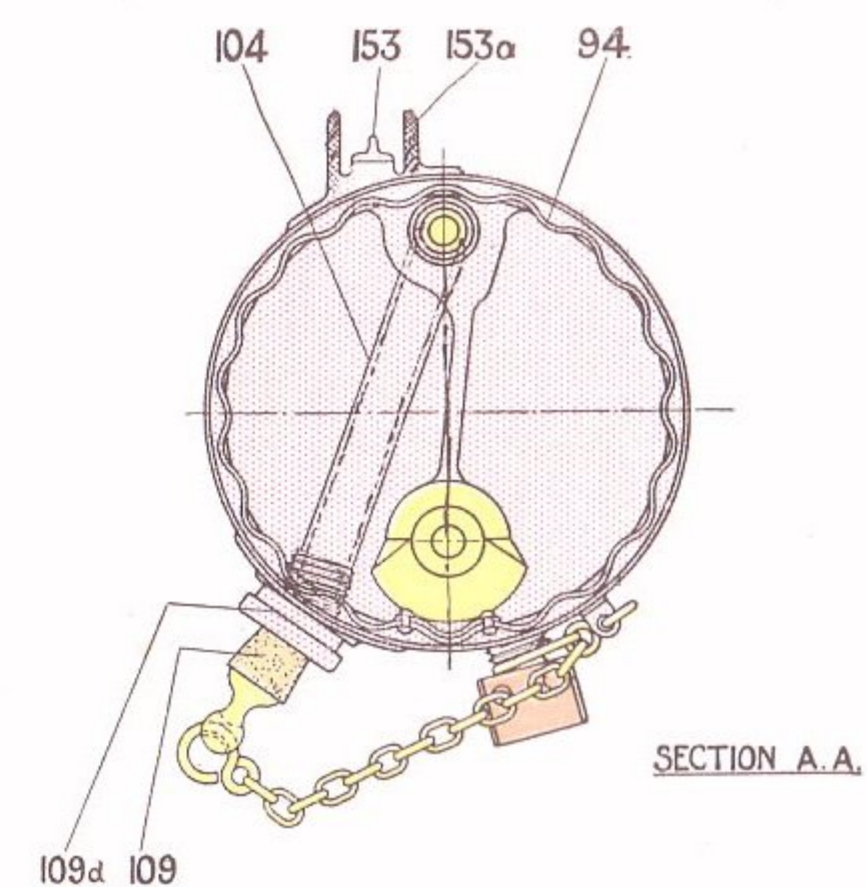
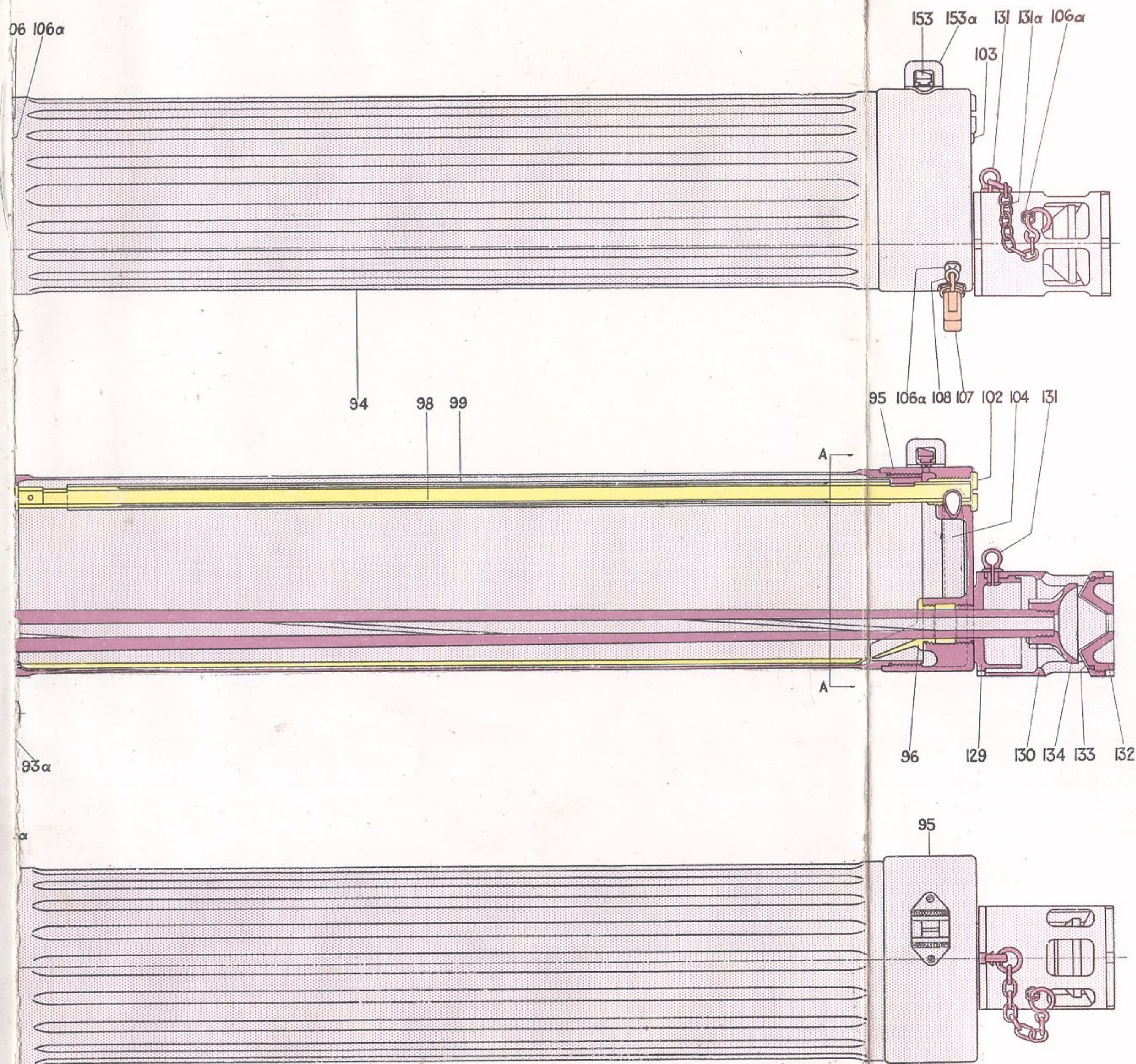


Plate 8. Arrangement of Anti-Aircraft Foresight.

Plate 9.
GENERAL
ARRANGEMENT
OF THE GUN.

(49)





Machine Gun (Water Cooled) for Land Service (Class "C"—Rifle Calibre).
General Arrangement of the Gun.

Plate 10.
RECOILING
MECHANISM

(50)

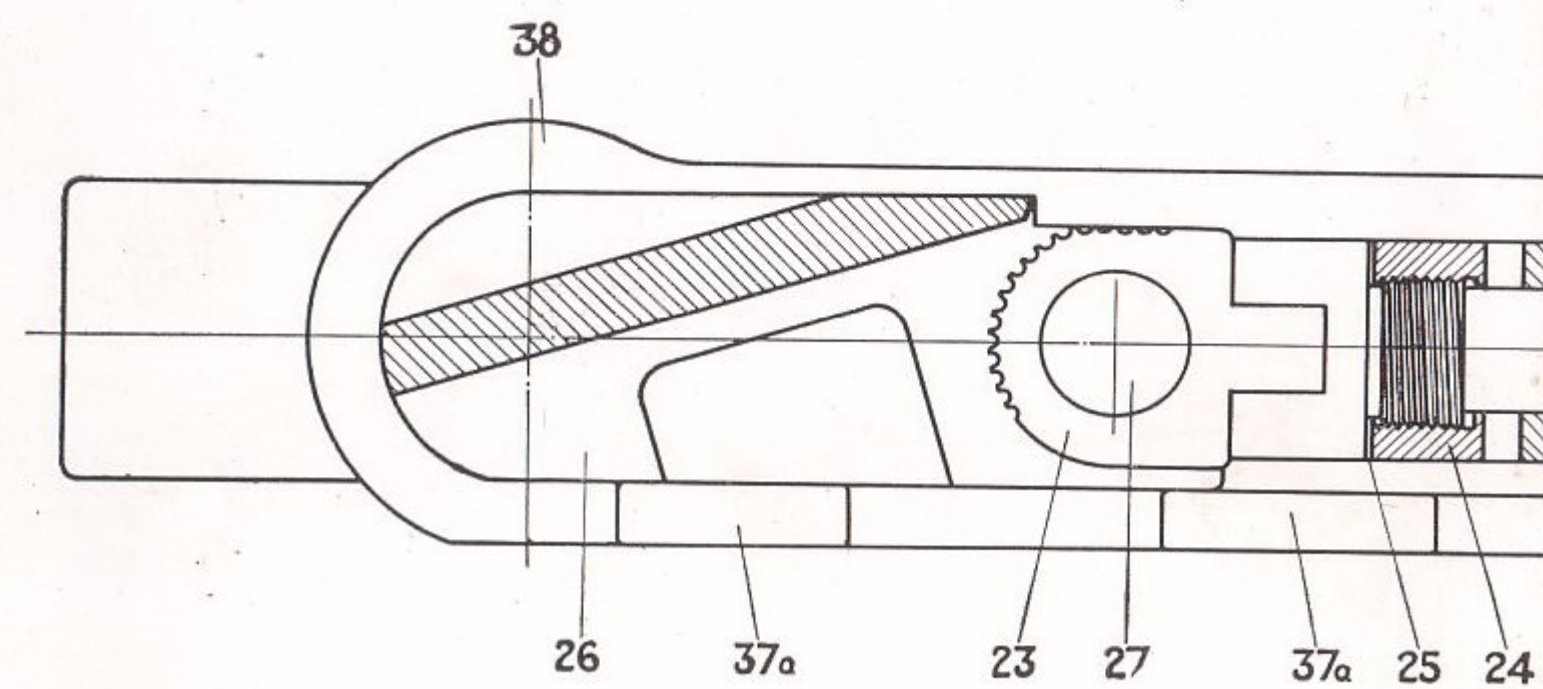
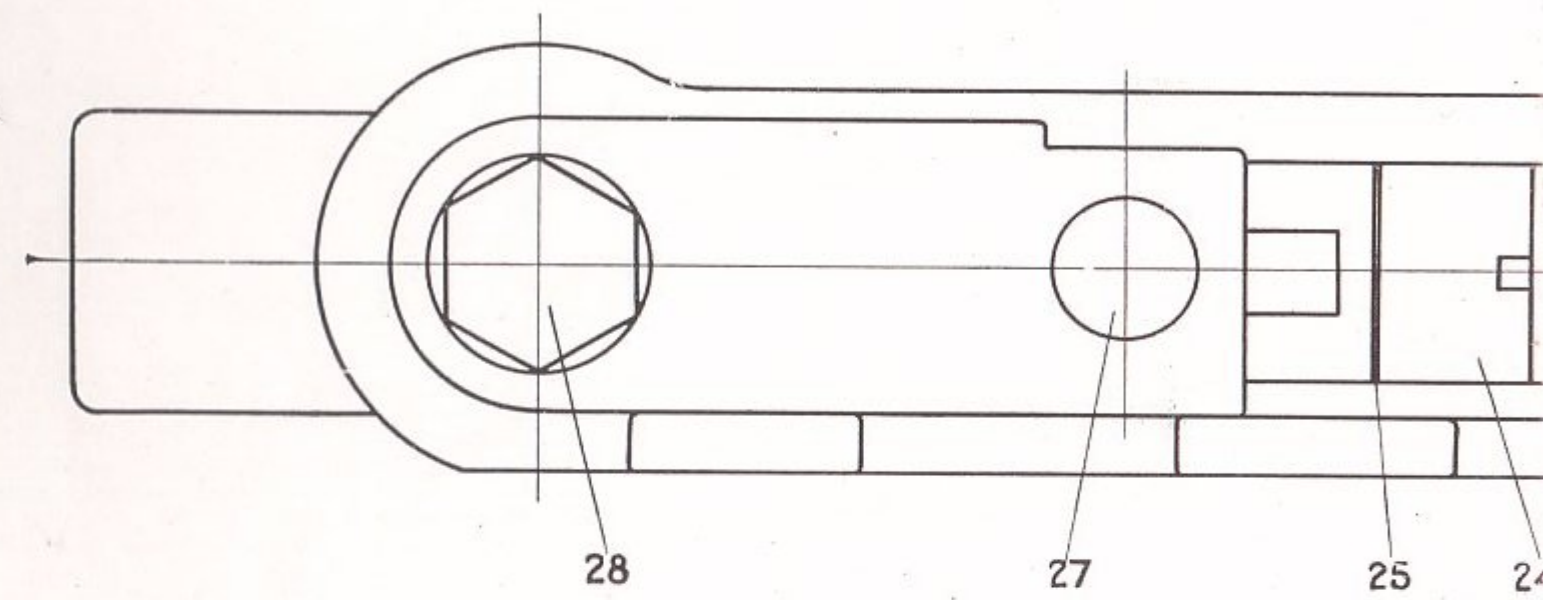
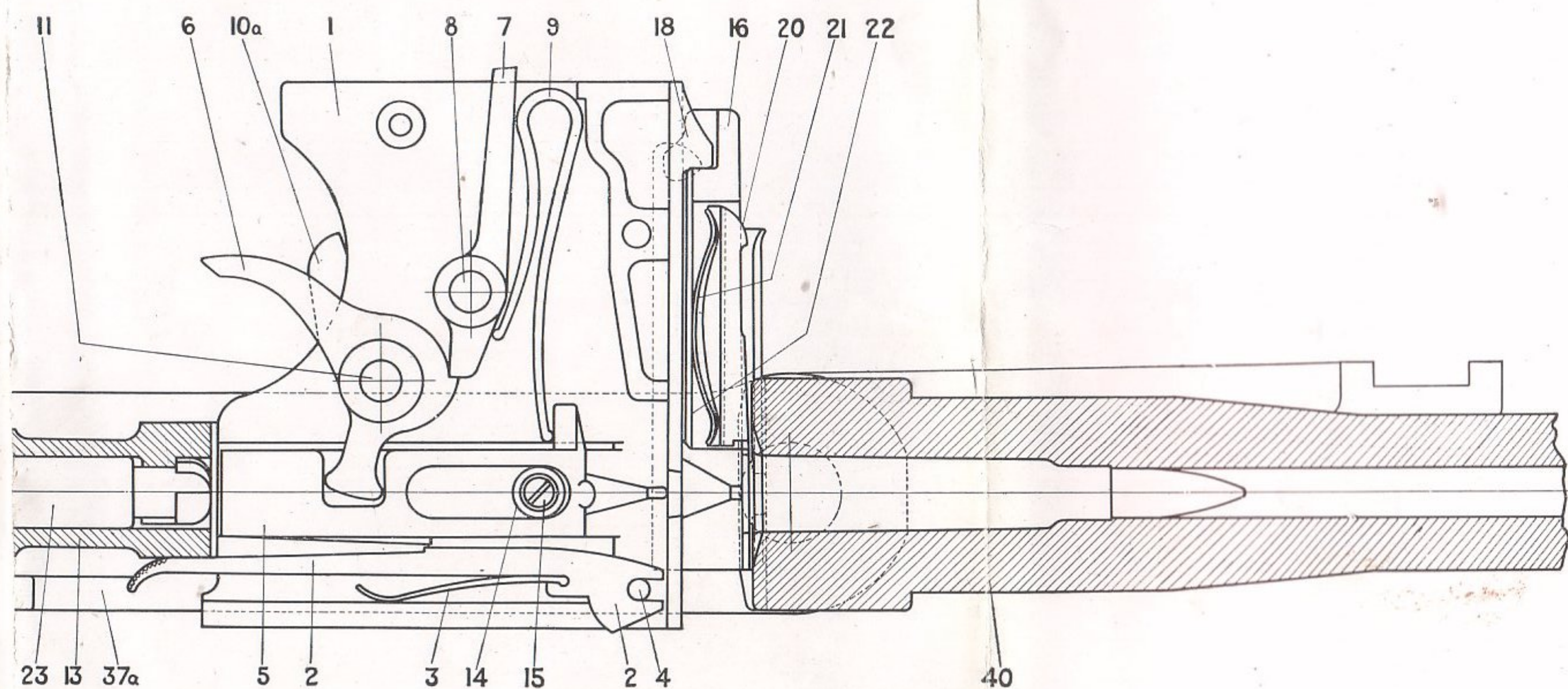
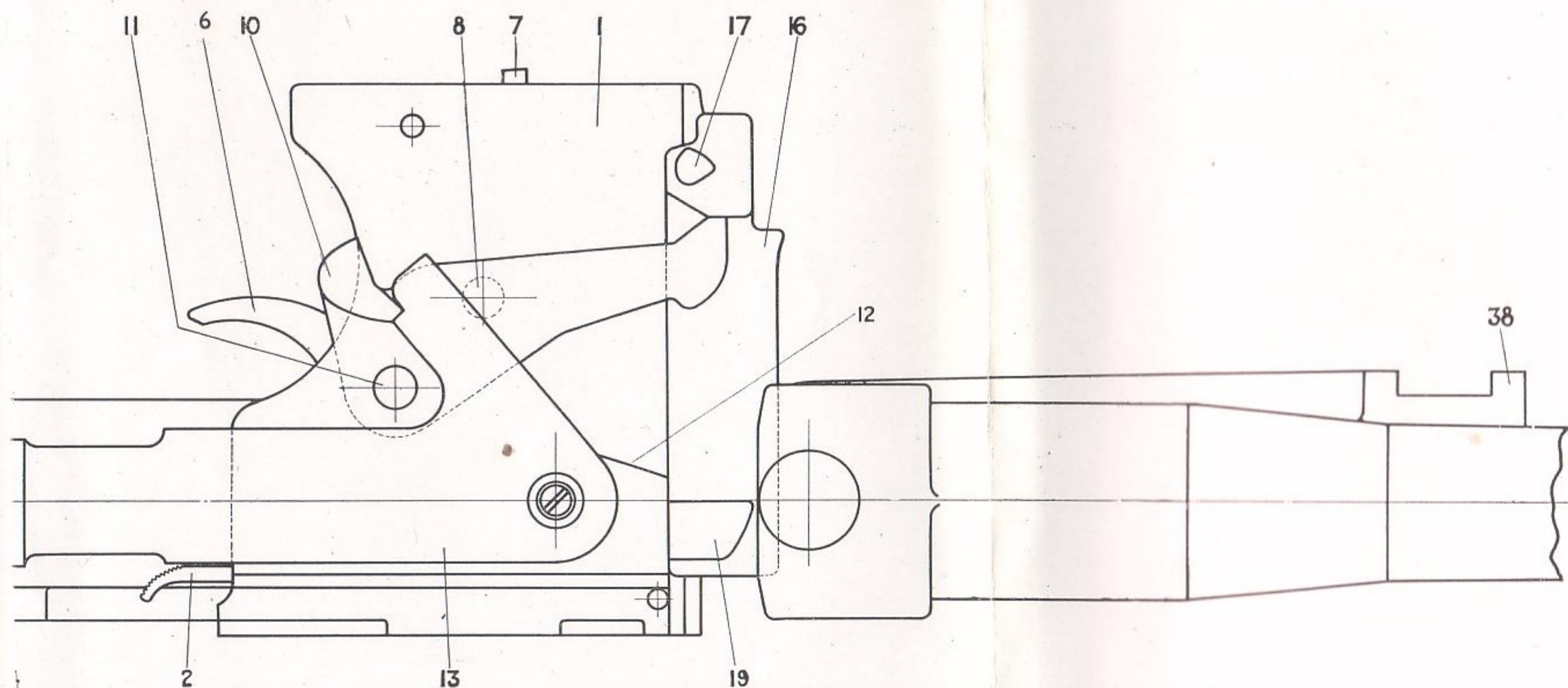


Plate 10.—Vickers Machine



Gun (Water cooled) for Land Service (Class "C"—Rifle Calibre).
Arrangement of Recoiling Mechanism.

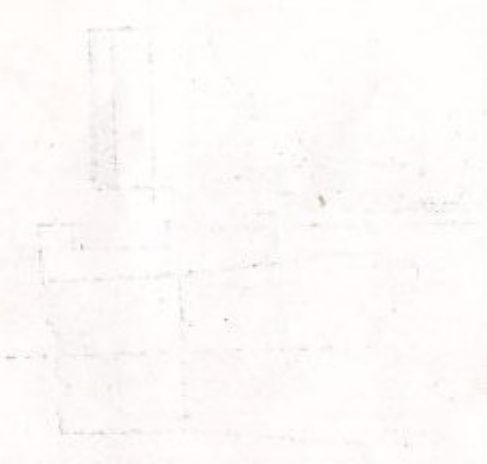


Plate 11.
ACTION OF THE
MECHANISM.

(51)

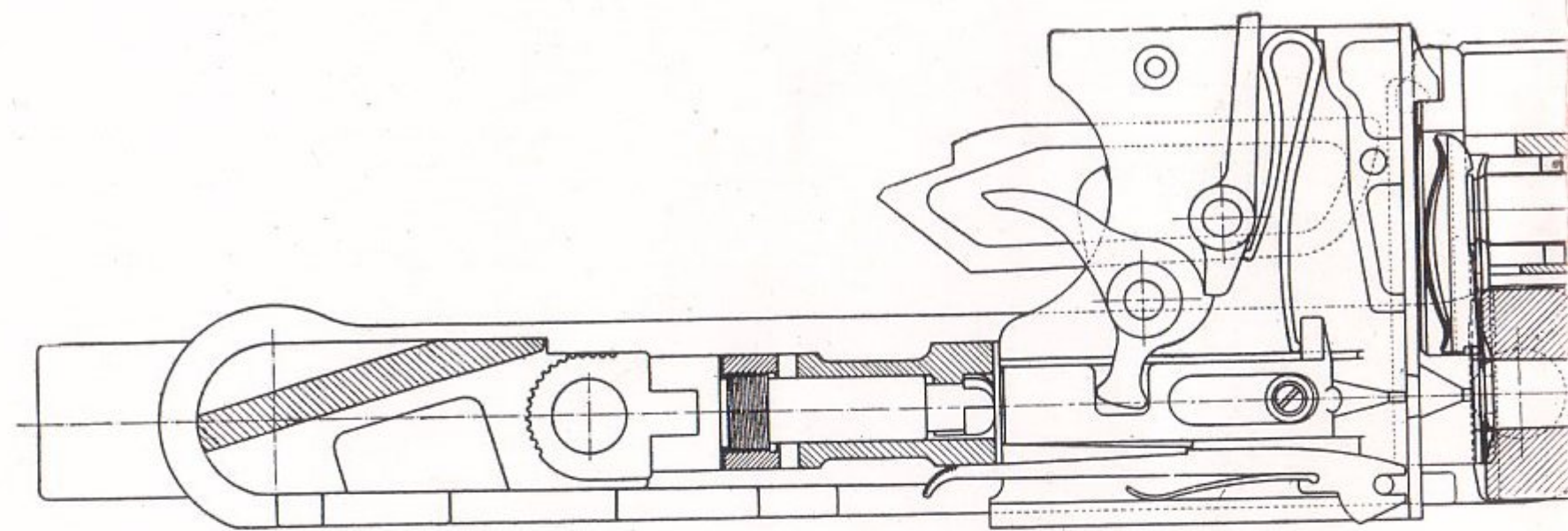


Fig. I. FIRING POSITION.

Lock, Barrel and Recoil Plates, fully home. Firing Pin cocked. Extractor engaging with two live cartridges, one in the Barrel Block.

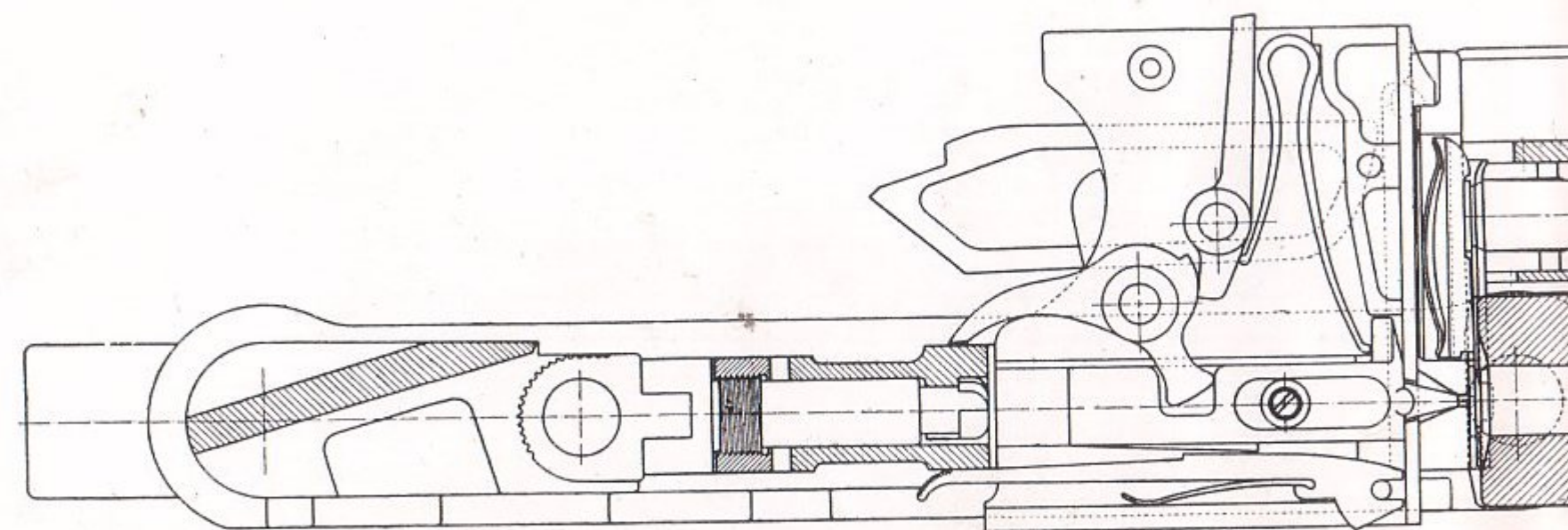
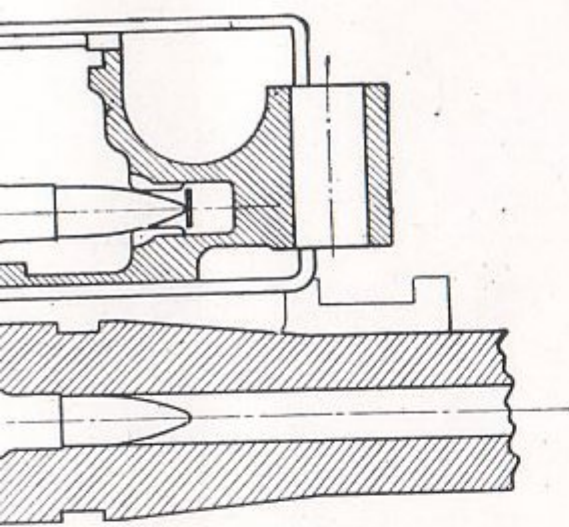
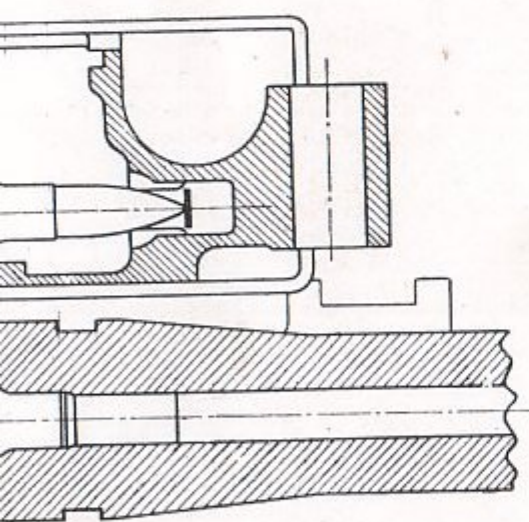


Fig. II. FIRED POSITION.

Lock, Barrel and Recoil Plates fully home. Firing Pin released. Extractor engaging with a live cartridge in the Feed Block and with the empty cartridge case in the Barrel Block.



andsear and
in the Feed



the Extractor
in the Barrel.

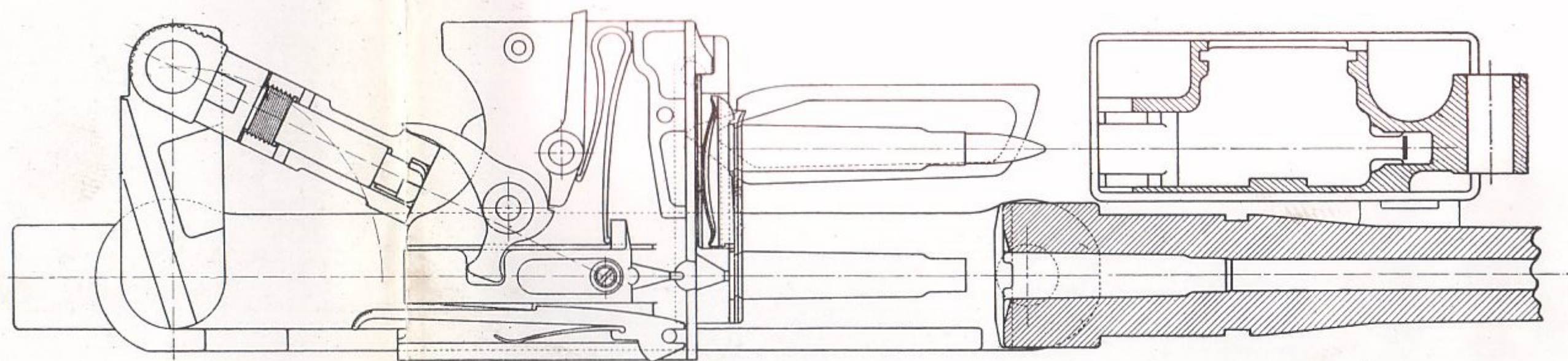


Fig. III. RECOILING POSITION.

Lock partly recoiled, cocking the Firing Pin, extracting the live cartridge from the Feed Block and the empty case from the Barrel. Barrel and Recoil Plates fully recoiled and on the point of returning.

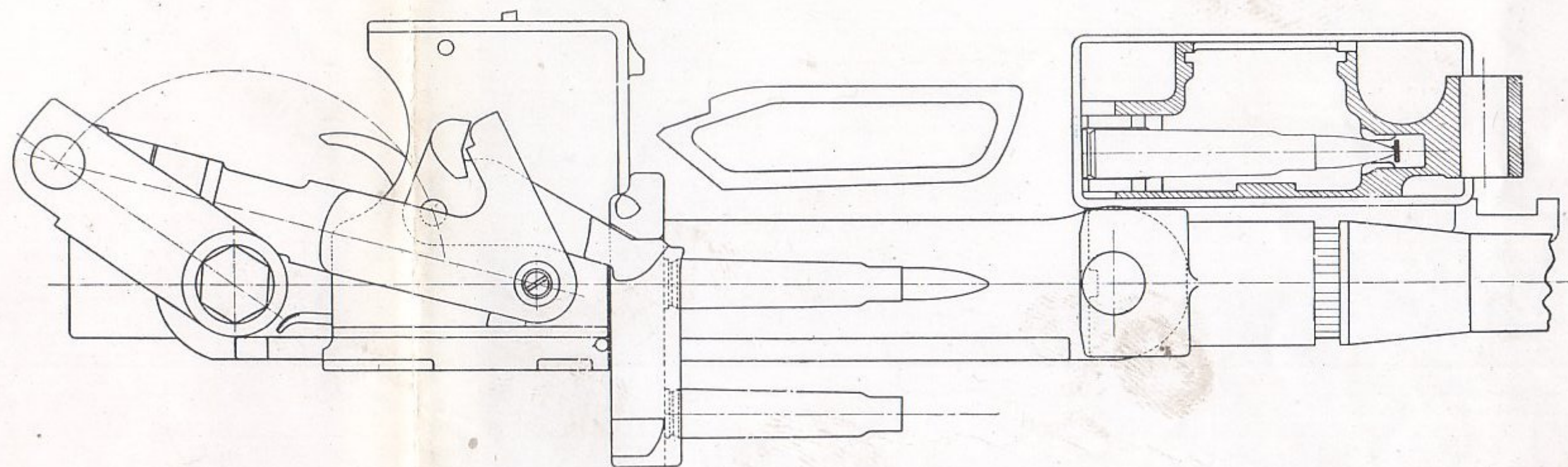
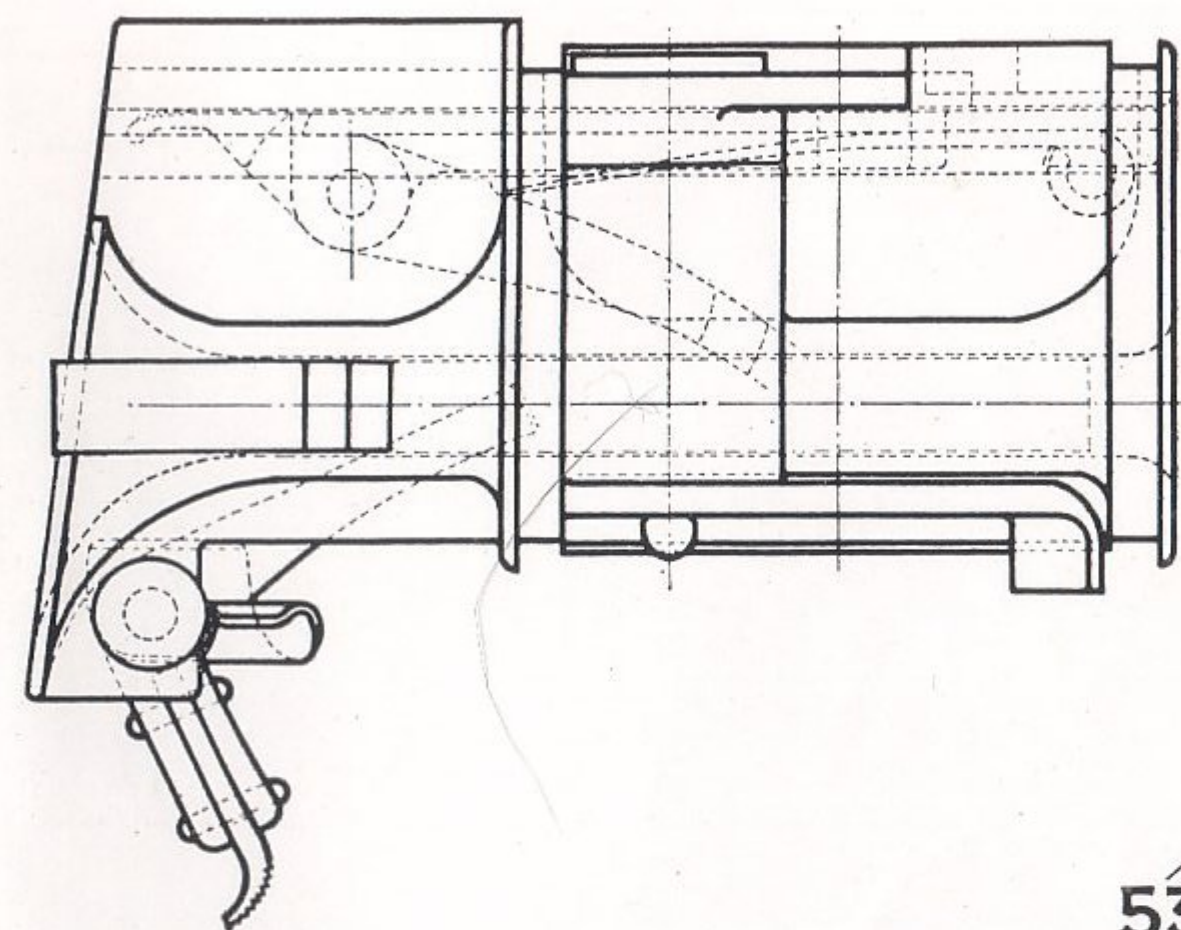


Fig. IV. RETURNING POSITION.

Lock fully recoiled and on the point of returning. Firing Pin cocked on to Safety Sear. Extractor in dropped position bringing live cartridge in line with the chamber of the Barrel. Barrel and Recoil Plates fully returned and new cartridge brought into Feed Block.

Plate 11.—Vickers Machine Gun (Water cooled) for Land Service.
(Class "C"—Rifle Calibre).
Action of the Mechanism.

Plate 12
ARRANGEMENT OF
FEED BLOCK
(52)



53

4

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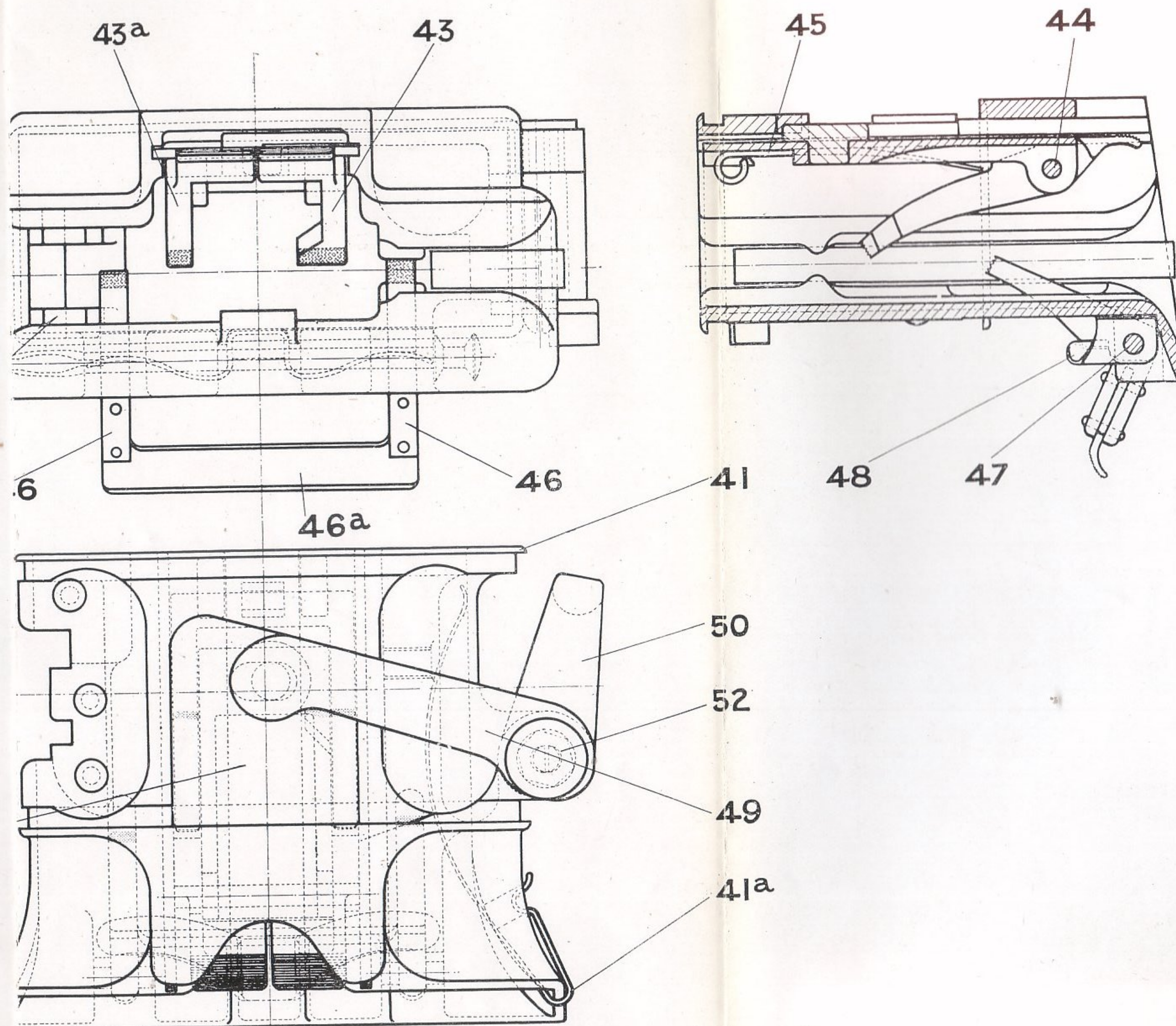


Plate 12.—Arrangement of Feed Block.

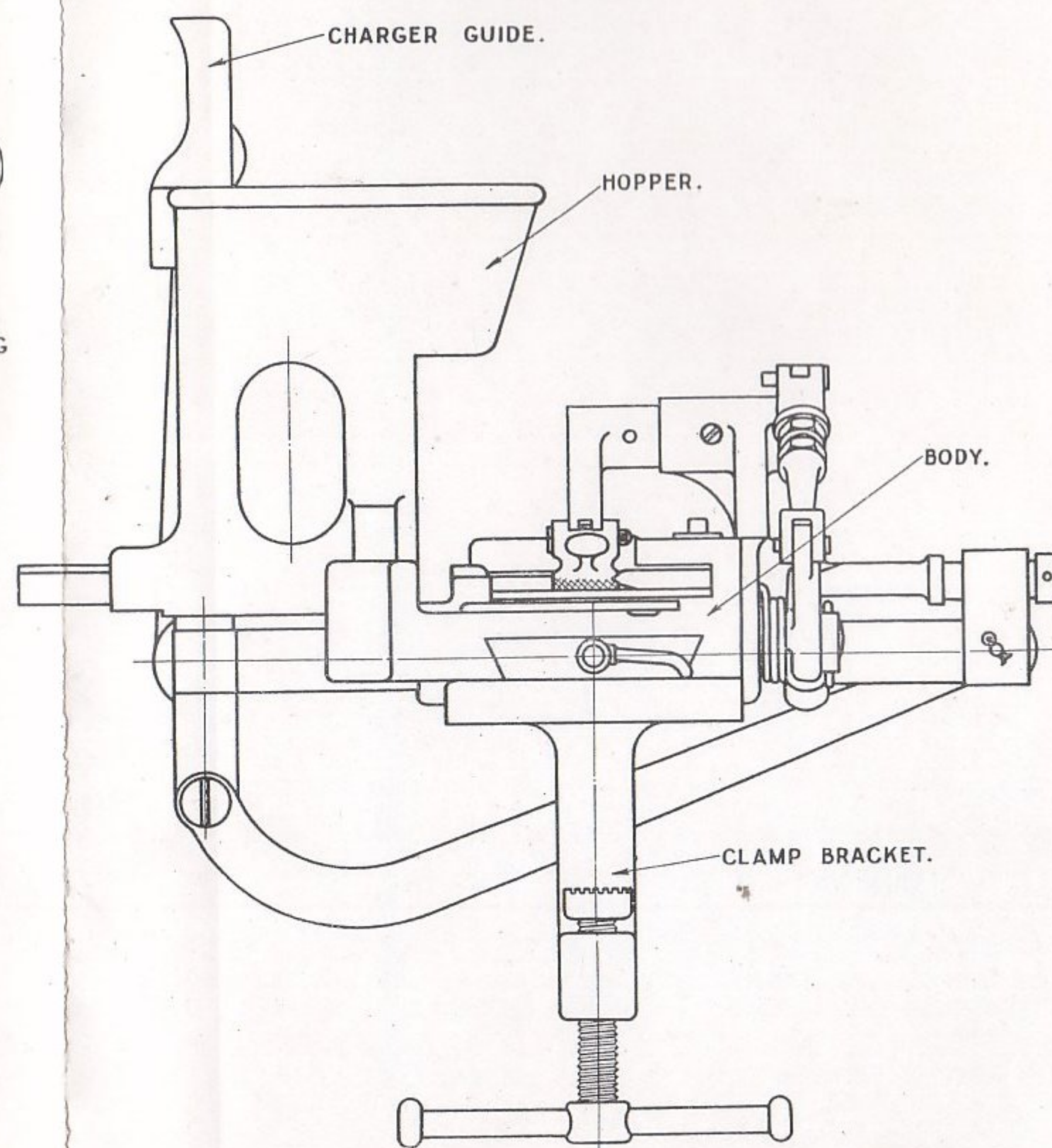
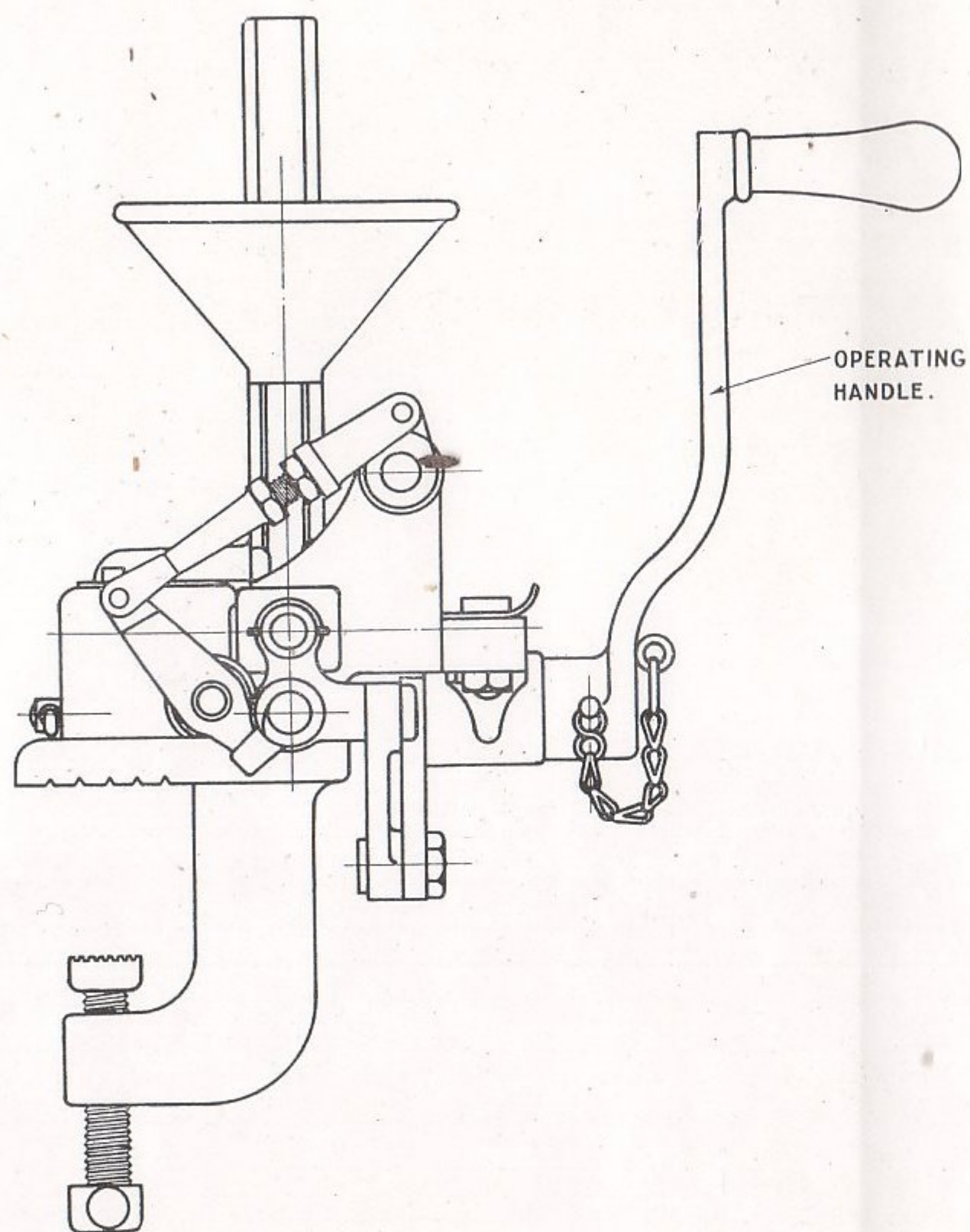


Plate 13.
Belt-filling
Machine.



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